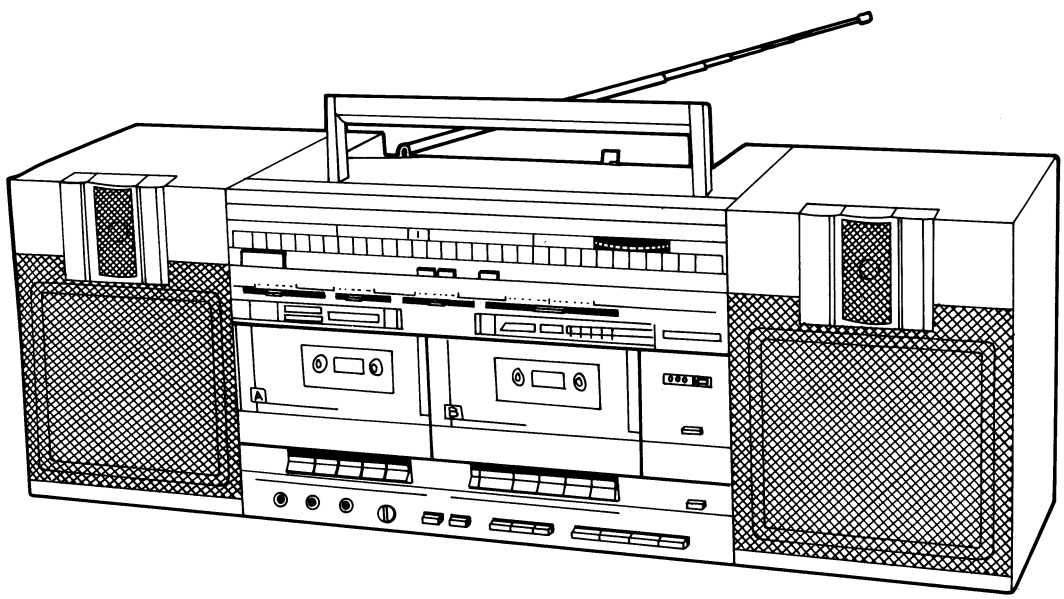
GoldStar

Service Manual

DOUBLE DECK

STEREO CASSETTE RECORDER

MODEL TSW-960



ted in Korea

Nov. 1985
SV3-961B

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PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related features, which cannot necessarily be assured by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety features are identified in this manual, by a ⚠ in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitude replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

SPECIFICATIONS

AUDIO PERFORMANCE SPECIFICATIONS

	Item		Unit	Nominal	Limit	Test Condition
1	Output (DC/AC)		W	10/10	10/10W −1 dB	10% THD Power, 6 ohm FM∼98 MHz, 1 kHz, 37.5 kHz Dev. 60 dB input AM∼1 MHz, 400 Hz, 50% Mod. 74 dB input Line∼400 mV, 1 kHz Phono∼5 mV, 1 kHz
2	T.H.D.		%	0.2	1	500 mW, 6 ohm, 1 kHz Line input−400 mW
3	Frequency response		Hz	80∼16000	125∼14000	50 mW, 6 ohm Line input∼400 mV
4	S/N ratio		dB	68	55	500 mW, 6 ohm Line input∼400 mV
5	Cross talk		dB	46	39	500 mW, 6 ohm, Line 400 mW, 1 kHz
				40	30	500 mW, 6 ohm, Line in∼400 mV, 100∼14 kHz
6	Tone control	Bass 100 Hz Treble 10 kHz	dB	±7	±7 (±$\frac{7}{3}$)	500 mW, 6 ohm Line in∼400 mV
7	Input sensitivity	Phono, Tape	mV	5		Phono, 1 kHz
		Din in		500		Line, 1 kHz Source 1 MP.∼470KΩ
8	Input impedance	Phono	kΩ		47±10	
		Mic			10±10	
		Din in			2.2±5	

MW PERFORMANCE SPECIFICATIONS

	Item	Test Freq. (kHz)	Unit	Limit	Nominal	Test Condition
1	Frequency range		kHz	520∼1630	515∼1650	
2	I.F.		kHz		455±1	
3	Usable sensitivity (20 dB S/N)	600	dB	56	52	400 Hz, 30% Mod R.O.P.: 500 mW
		1000		54	49	
		14000		54	49	
4	S/N ratio	1000	dB	35	44	
5	I.F. rejection ratio	600, 1400	dB	50	60	
6	Image rejection ratio	600, 1400	dB	30	45	
7	Selectivity	1000	dB	20		±9 kHz
8	10% T.H.D. output	1000, 1400		−1 dB	10W	74 dB input, 400 Hz, 50% Mod
9	T.H.D.	1000, 1400	%	4		74 dB input, 400 Hz, 30% Mod, output∼500 mW
10	Frequency response (100 Hz, 2 kHz)	1000	dB	−6		

FM PERFORMANCE SPECIFICATIONS

	Item	Test Freq. (MHz)	Unit	Limit	Nominal	Test Condition
1	Frequency range		MHz	88~108	87~109	
2	I.F.		MHz		10.7	
3	Usable sensitivity (30 dB S/N)	90	dB	16	12	R.O.P. = 500 mW
		98		16	12	
		106		16	12	
4	S/N ratio	98	dB	50	55	
5	I.F. rejection ratio	90, 98	dB	60		
6	Image rejection ratio	90, 98, 106	dB	25		
7	10% T.H.D. output	98		−1 dB	10W	60 dB input, 1 kHz, 37.5 kHz Dev.
8	T.H.D.	98	%	2		60 dB input, 1 kHz 22.5 kHz Dev.
9	Frequency response (80 Hz, 14 kHz)	98	dB	−6		

LW PERFORMANCE SPECIFICATIONS

	Item	Test Freq. (kHz)	Unit	Limit	Nominal	Test Condition
1	Frequency range		kHz		140~360	
2	Usable sensitivity	160	dB	63		
		230	dB	61		
		330	dB	60		
3	Image rejection ratio	230	dB	26		
4	I.F. rejection ratio	230	dB	26		
5	S/N ratio	230	dB	30		Input~94 dB, 400 Hz, 30% Mod.

SW PERFORMANCE SPECIFICATIONS

	Item	Test Freq. (MHz)	Unit	Limit	Nominal	Test Condition
1	Frequency range		MHz		5.7~18.5	
2	Usable sensitivity	6.5	dB	45		
		11	dB	45		
		16	dB	45		
3	Image rejection ratio	16	dB	3		
4	S/N ratio	11	dB	40		Input 60 dB, 400Hz, 30% Mod.

TAPE PERFORMANCE SPECIFICATIONS

	Item		Test Tape	Unit	Limit	Nominal	Test Condition
1	Tape speed		MTT-111	Hz/sec	+3, −2	3000	
					+3, −2	6000	High speed position
2	Winding time	F.F	C-60	sec	106		
		Rew.	C-60		106		
3	Wow & Flutter		MTT-111	%	0.25	0.005	JIS WRMS
4	Freq. response (Play)	Normal	MTT-216	dB	7		100 Hz, 1 kHz, 12.5 kHz
		CrO_2	MTT-316		7		
5	Freq. response (Rec./Play/DIN)	Normal	MTT-502	dB	7	3	NR off, 125 Hz, 1 kHz, 12.5 kHz
					6	3	NR on, 125 Hz, 1 kHz, 10 kHz
6	Distortion (3rd)	Play	MTT-118	%	3		
		Rec./Play	MTT-502		3.5	2.2	Aux input 400 mV, 333 Hz
7	Output	Play	MTT-150		−1 dB	10W	10% T.H.D.
8	S/N ratio (DIN IN)	Play	MTT-112S	dB	45	50	Unweighted (DC)
		Rec./Play			44	48	
9	Cross talk	Track		dB	40		with B.P.F.
		Channel			30		

NOTE: Nominal specs represent the design specs: all units should be able to approximate these-some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition which still might be considered acceptable: in no case should a unit perform to less than within any limit spec.

DIAL CORD STRINGING

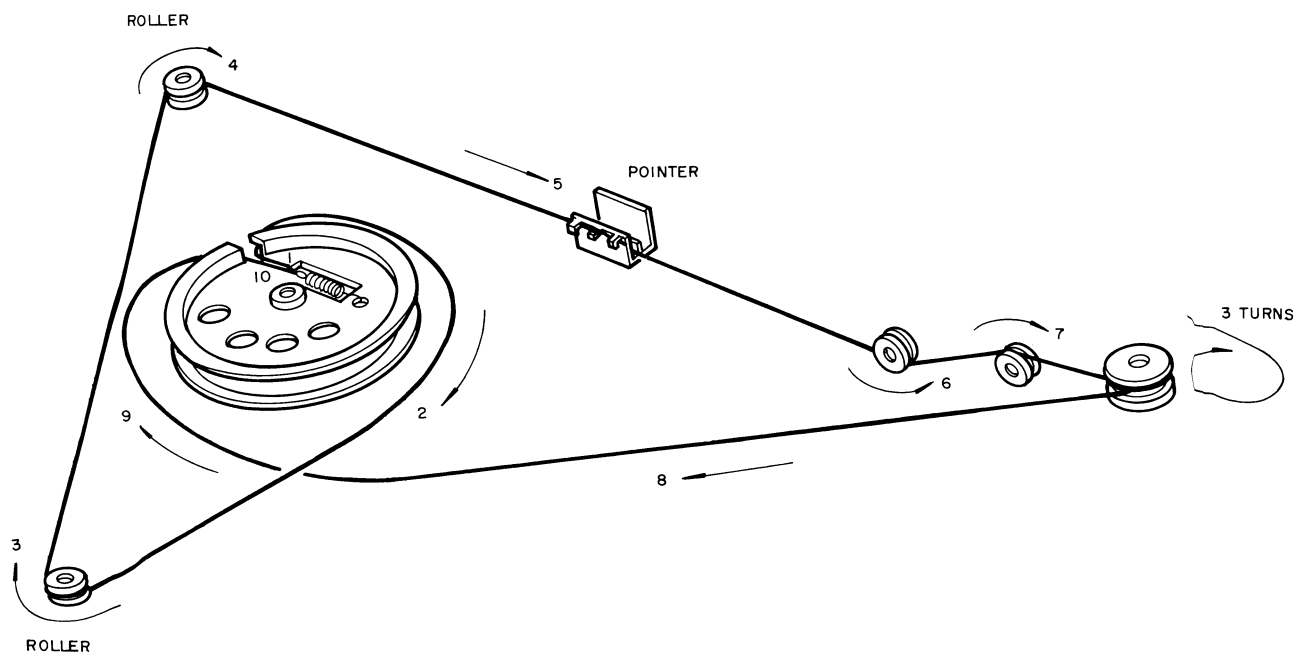
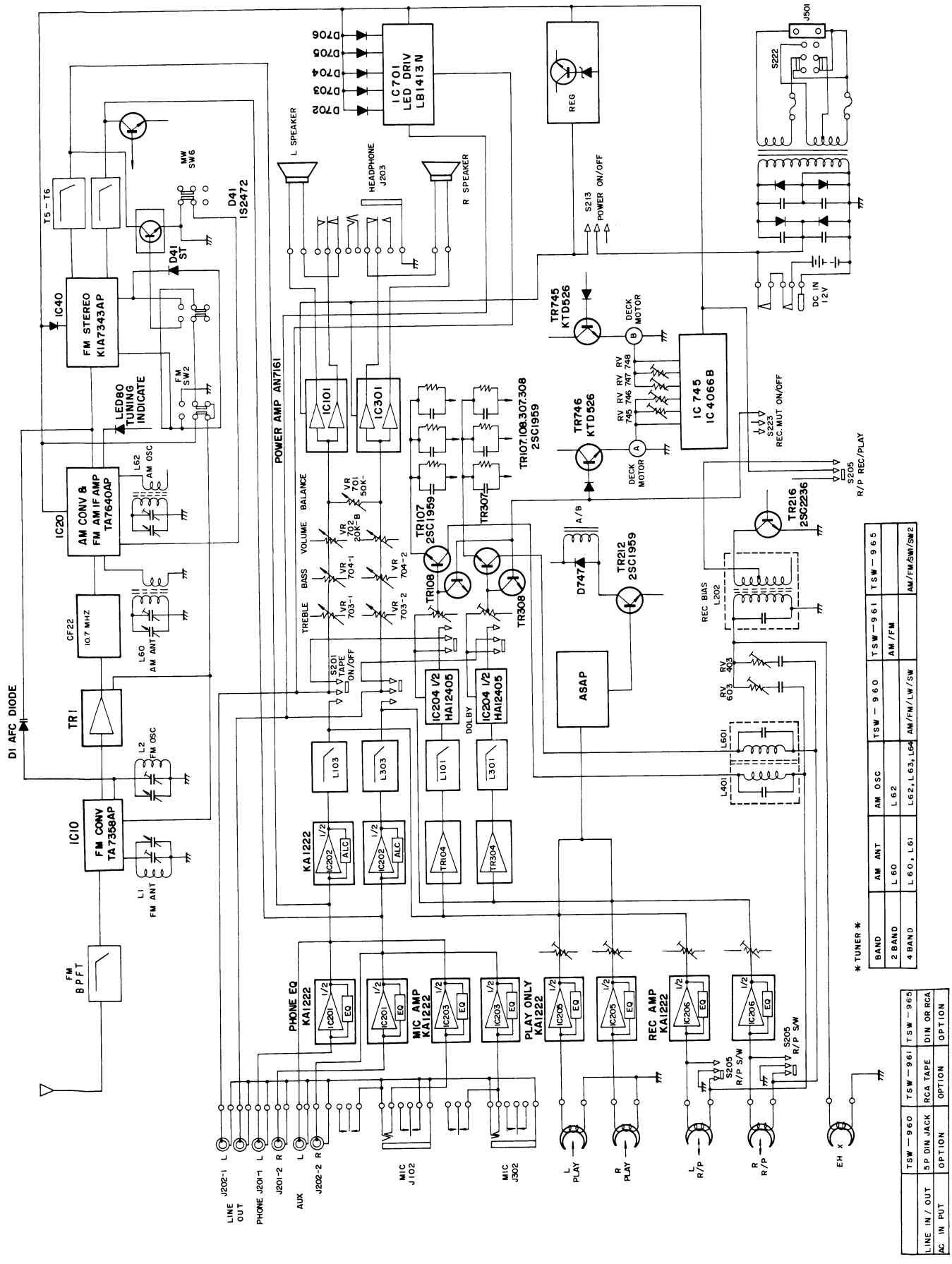


Figure 1

Set the tuning capacitor to minimum frequency and string the cord following the number in figure 1.

BLOCK DIAGRAM



* TUNER *

BAND	AM ANT	AM OSC	TSW - 960	TSW - 961	TSW - 965
2 BAND	L60	L62		AM/FM	
4 BAND	L60, L61	L62, L63, L64	AM/FM/LW/SW		AM/FM/SW1/SW2

	TSW - 960	TSW - 961	TSW - 965
LINE IN / OUT	5P DIN JACK	RCA TAPE	DIN OR RCA
AC IN PUT	OPTION	OPTION	OPTION

ALIGNMENT INSTRUCTIONS

EQUIPMENT NEEDED

1. AM Signal Generator
2. FM Signal Generator
3. AM/FM IF Genescope
4. FM Stereo Signal Generator
5. Oscilloscope
6. Output Meter (VTVM)
7. Frequency Counter
8. Nonmetallic Alignment Tools
9. Test Tape: MTT-114 (10 kHz)
   MTT-150
   MTT-257E
   MTT-357E
   MTT-111

IMPORTANT

1. Check power-source voltage.
2. Set the function switch to band being aligned.
3. Turn volume control to minimum unless otherwise noted.
4. Connect low side of signal source and output indicator to chassis ground unless otherwise specified.
5. Keep the signal input as low as possible to avoid AGC and AFC action.
6. Standard modulation is 400 Hz at 30% for AM. (400 Hz at 22.5 kHz deviation for FM)
7. Keep the minimum output as low as possible the output of Genescope.
8. Use input impedance of VTVM a 100 kΩ.
9. The line in and out may be changed for the din in and out by option in set.

ADJUSTMENT POINT

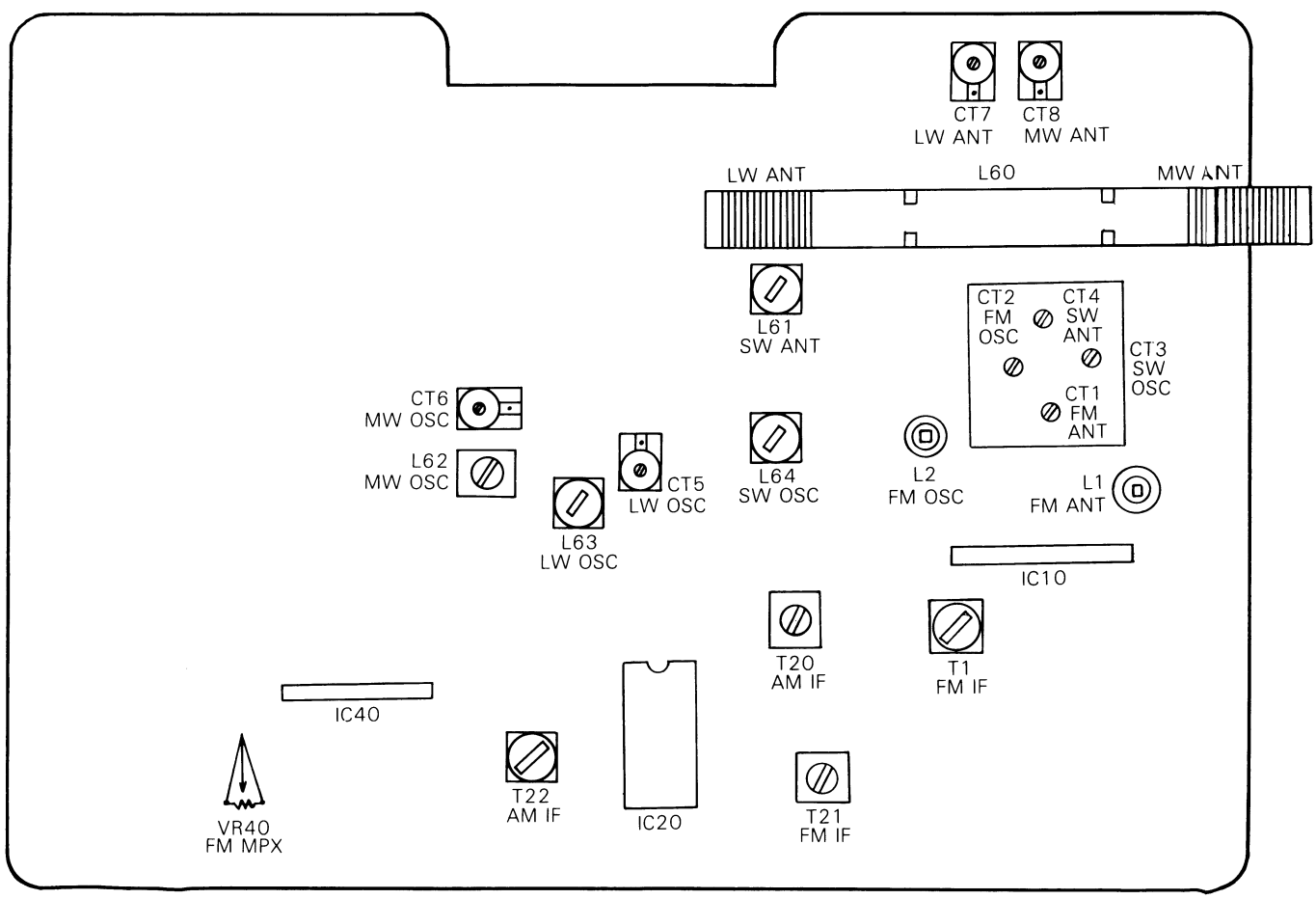


Figure 2. RF P.C. Board

AM IF ADJUSTMENT

IF Genescope .... The input connects the pin No. 9 of IC20 and the GND, through the dummy, the output connects the condensor 0.2~0.47 μF in serial at both terminal of dummy antenna in secondary of the AM antenna coil L60.

Adjust for the IF wave form of Genescope to be maximum. (See figure 3)

Step	Dial pointer position	Genescope output (kHz)	Adjustment
1	Highest frequency	455	T20, T22 (See figure 4)
2	Repeat step 1 several times.		

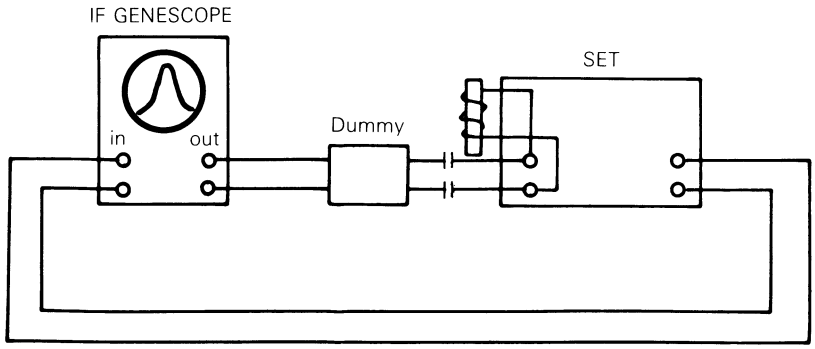


Figure 3. AM IF alignment connection diagram

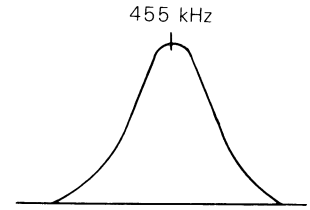


Figure 4. AM IF curve

LW/MW RF ADJUSTMENT

Signal Generator .... Connects to the AM antenna coil L60 through the loop antenna.

Adjust for the indication of VTVM or the wave form of scope to be maximum. (See figure 5)

Band	Step	Dial pointer position	SG output (kHz)	Adjustment
LW	1	Lowest frequency	140	L63
	2	Highest frequency	360	CT5
	3	Repeat steps 1 and 2 several times.		
	4	600 kHz	160	L60
	5	1400 kHz	330	CT7
	6	Repeat steps 4 and 5 several times.		
MW	1	Lowest frequency	515	L62
	2	Highest frequency	1650	CT6
	3	Repeat steps 1 and 2 several times.		
	4	600 kHz	600	L60
	5	1400 kHz	1400	CT8
	6	Repeat steps 4 and 5 several times.		

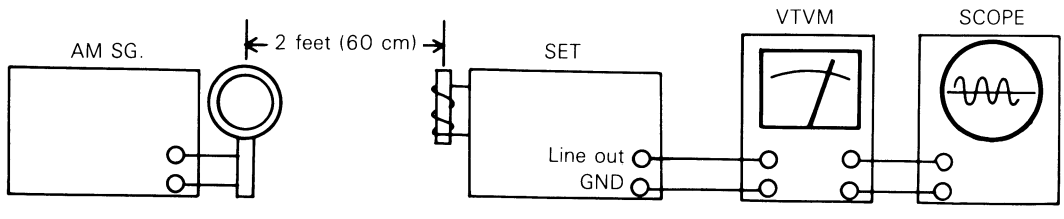


Figure 5. LW & MW band/tracking alignment connection diagram.

SW RF ADJUSTMENT

Step	Dial pointer position	SG output (MHz)	Adjustment
1	Lowest frequency	5.7	L64
2	Highest frequency	18.5	CT3
3	Repeat steps 1 and 2 several times.		
4	6.5 MHz	6.5	L61
5	16 MHz	16	CT4
6	Repeat steps 4 and 5 several times.		

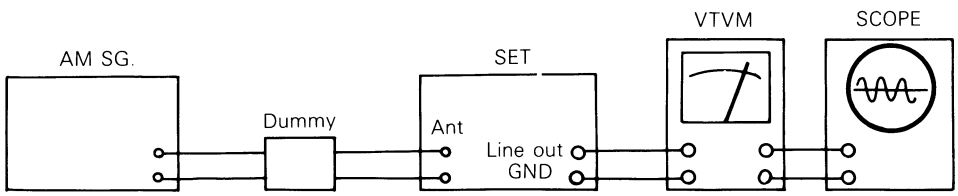


Figure 6. SW band/tracking alignment connection diagram

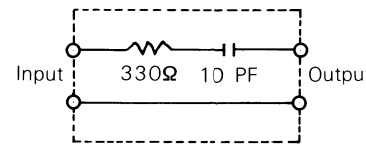


Figure 7. SW dummy ant

FM IF ADJUSTMENT

IF Genescope .... The input connects the pin No. 9 of IC20 and the GND, the output connects the body of IC10 through the dummy. (See figure 8)

Step	Dial pointer position	Genescope output (MHz)	Adjustment	Remark
1	Highest frequency	10.7	T1	See figure 9
2	Highest frequency	10.7	T21	See figure 10
3	Repeat steps 1 and 2 several times.			

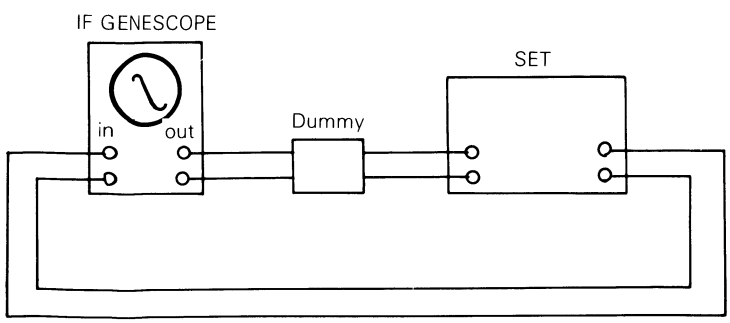


Figure 8. FM IF aligument connection diagram

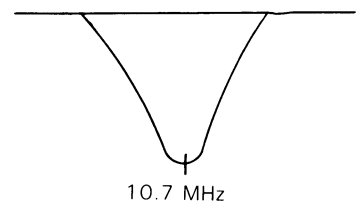


Figure 9

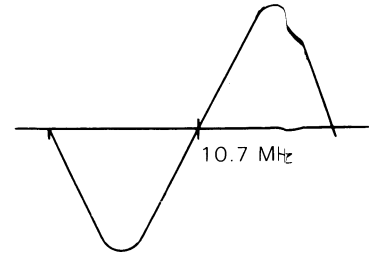


Figure 10

FM RF ADJUSTMENT

Signal Generator ....Connect to the FM antenna through the dummy. (See figure 11)
Adjust for indication of VTVM or wave form of scope to be maximum.

Step	Dial pointer position	SG output (MHz)	Adjustment
1	Lowest frequency	87.35	L2
2	Highest frequency	108.25	CT2
3	Repeat steps 1 and 2 several times.		
4	90 MHz	90	L1
5	106 MHz	106	CT1
6	Repeat steps 4 and 5 several times.		

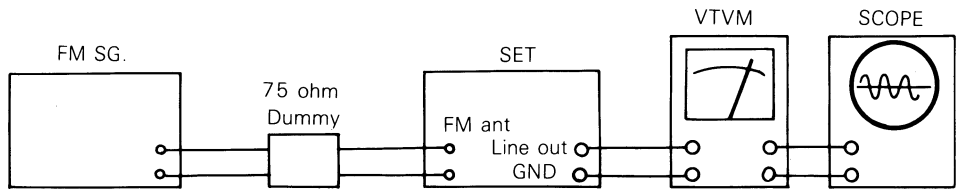
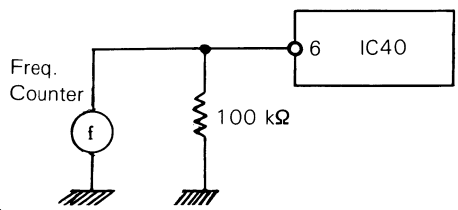


Figure 11. FM band/tracking alignment connection diagram

FM MPX ADJUSTMENT

Connect a 100 kΩ between the pin No. 6 of IC40 and GND.
Frequency counter .... Connect the following figure 12.



NOTE: Adjust at mono, 60 dB and non-modulation.

Adjustment	Frequency counter
VR40 (10 kB)	38 ± 0.1 kHz

Figure 12. FM MPX alignment connection diagram

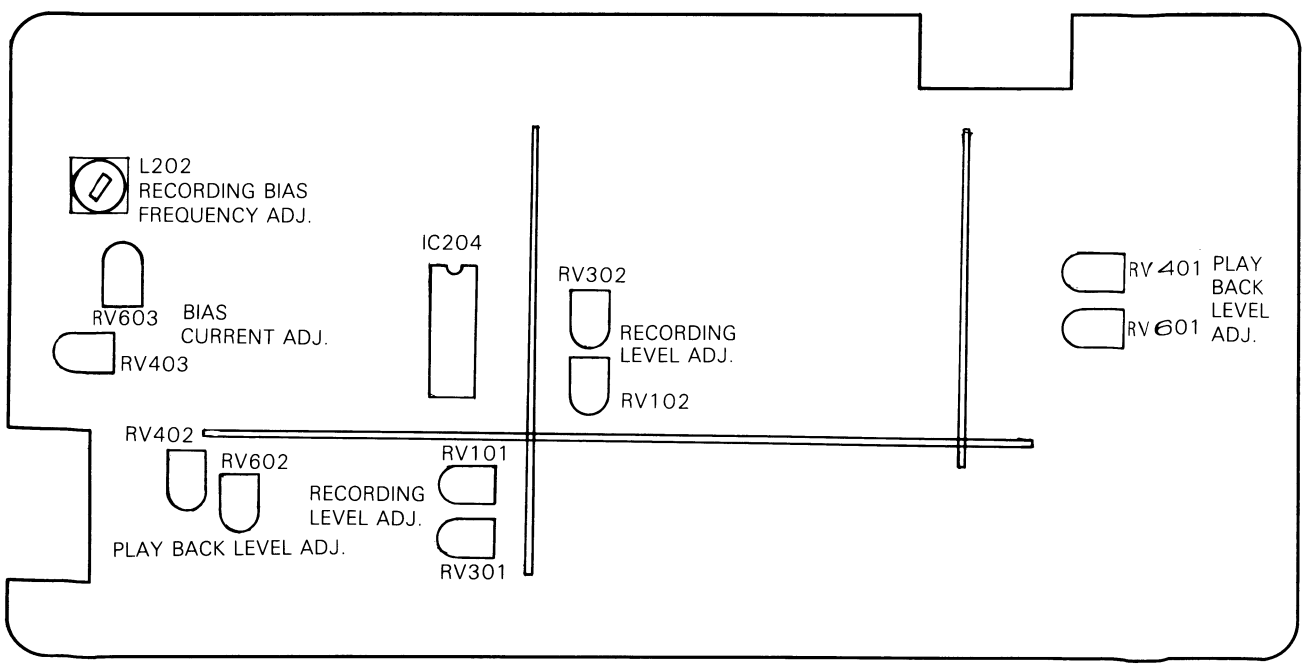
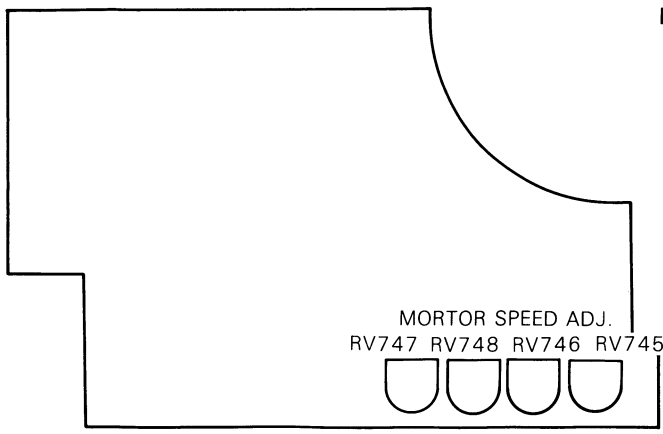


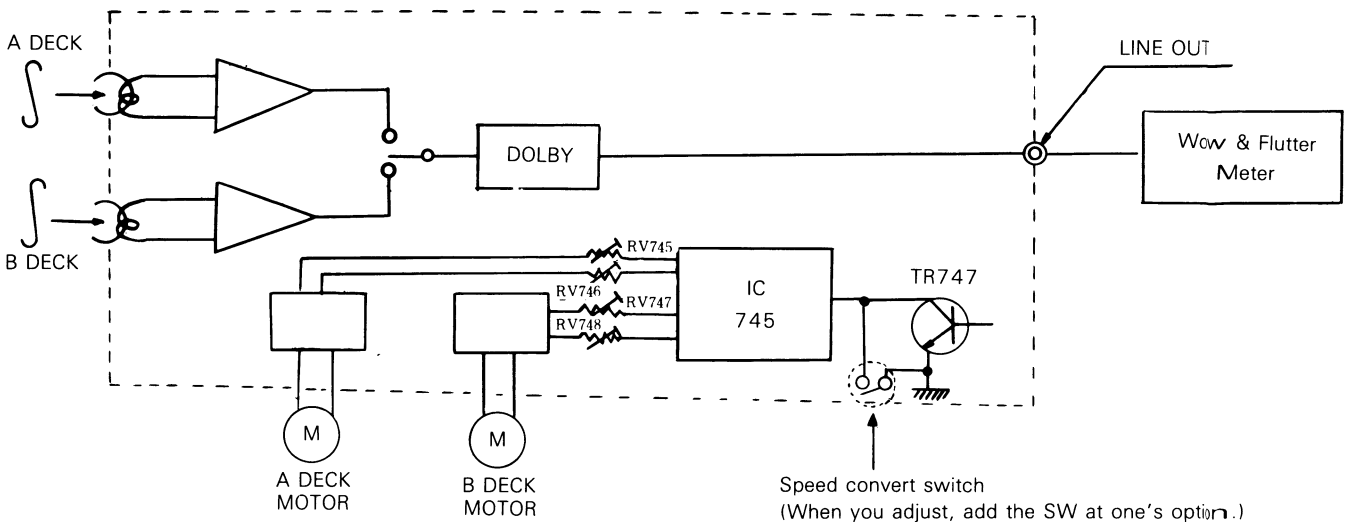
Figure 13. Main P.C. board



NOTE: When adjusting tape recorder, set the switches for adjusting as followings: Tape select switch at Normal, Dolby NR at off and Rec mode at Manual but for adjusting with CrO_2 tape and Metal, set the tape select switch at CrO_2 and/or Metal.

Figure 14. Motor P.C. board

MOTOR SPEED ADJUSTMENT



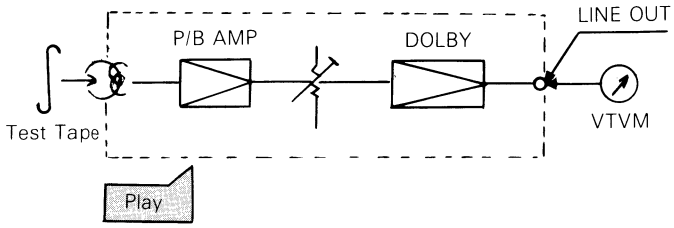
(1) Hi-speed adjustment

Input	Adjust for	Adjustment	Output	Remark
MTT-111	6000 Hz $^{+120}_{-60}$ Hz	A deck: RV745 B deck: RV748	Line out	Short the collector and emitter of TR747.

(2) Normal-speed adjustment

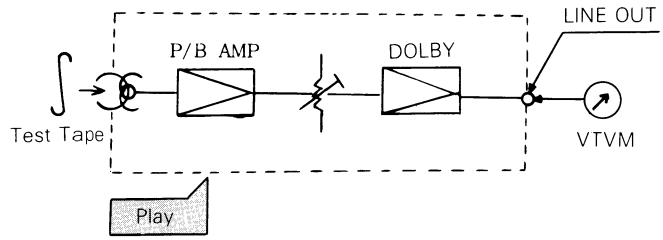
Input	Adjust for	Adjustment	Output	Remark
MTT-111	3000 Hz $^{+60}_{-30}$ Hz	A deck: RV746 B deck: RV747	Line out	Don't short the collector and emitter of TR747.

AZIMUTH ADJUSTMENT



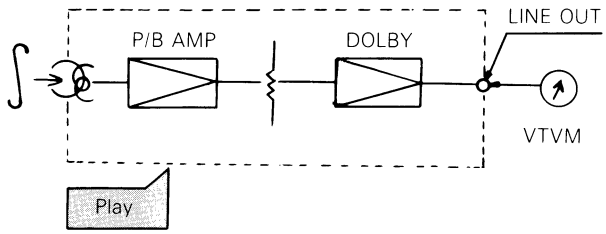
Input	Adjust for	Adjustment
MTT-114 (10 kHz)	Maximum	Azimuth adjusting screw

PLAY BACK LEVEL ADJUSTMENT



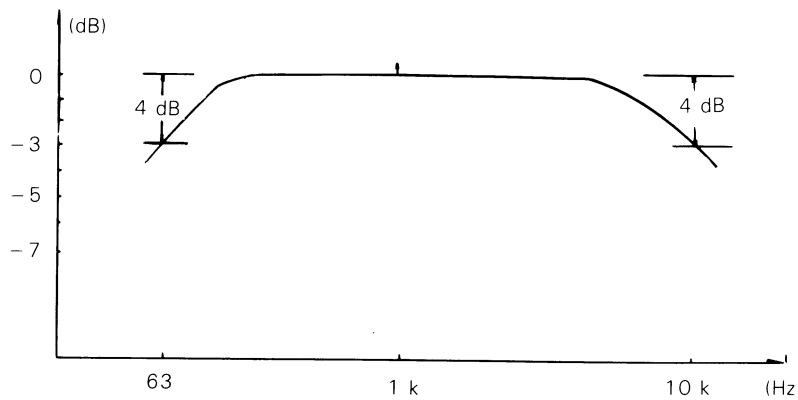
Input	Adjust for	Adjustment
MTT-150 (400 Hz)	580 mV ±0.7 dB	L: RV401, RV402 R: RV601, RV602

FREQUENCY RESPONSE MEASUREMENT



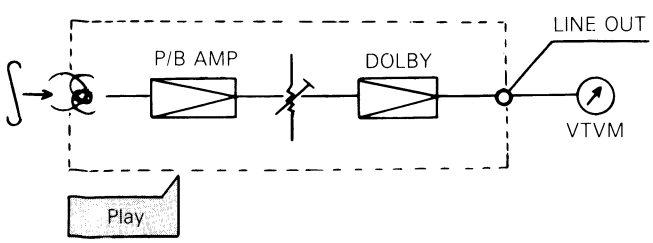
Step	Input	Tape position	Measurement
1	MTT-257E	NORMAL	See note
2	MTT-357E	CrO_2/METAL	

NOTE: Measure whether the difference level between 63 Hz and 10 kHz is within ±4 dB under 1 kHz 0 dB reference level.



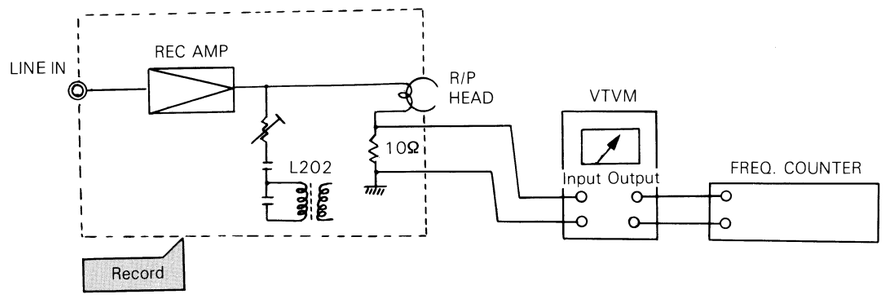
Frequency Response Curve

DOLBY NR CHARACTERISTIC



Input	Measurement
No signal	Measure whether the Dolby NR level at ON is lower 2~4 dB than OFF.

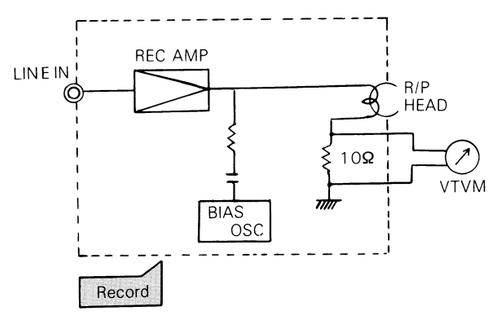
RECORDING BIAS FREQUENCY ADJUSTMENT



Input	Adjust for	Adjustment
No signal	85 ± 2 kHz	L202

* RIF SW: 1
* Tape Select SW: Metal

BIAS CURRENT ADJUSTMENT



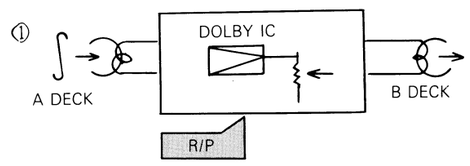
Input	Adjust for	Adjustment
No signal	AC 4.9 mV	L: RV603 R: RV403

* Tape Select SW: Normal.

RECORDING LEVEL ADJUSTMENT

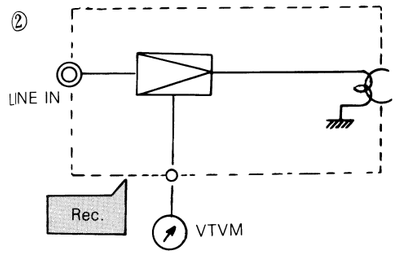
Adjust the following steps.

①



Input	Adjust R/P	Movement	Output Check
A DECK PLAY (MTT-150)	RV102 RV302	Recording at B Deck (DUBBING)	580 mV ± 0.7 dB at line out.

②



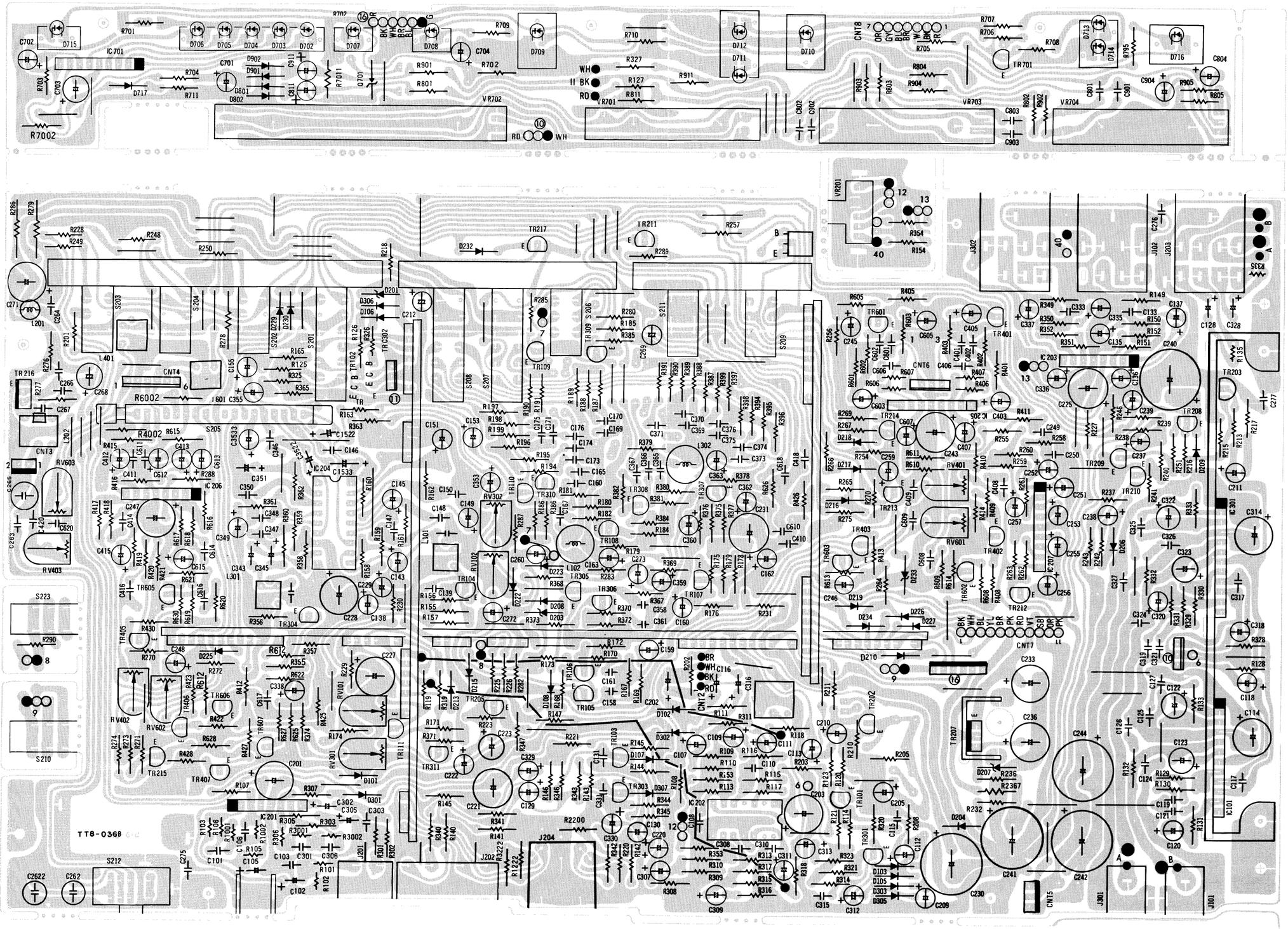
Input	MODE	Adjustment
LINE IN 400 mV 400 Hz	Record	RV101 RV301

* 580 mV ± 0.7 dB at Pin No. 1 and 18 of IC204

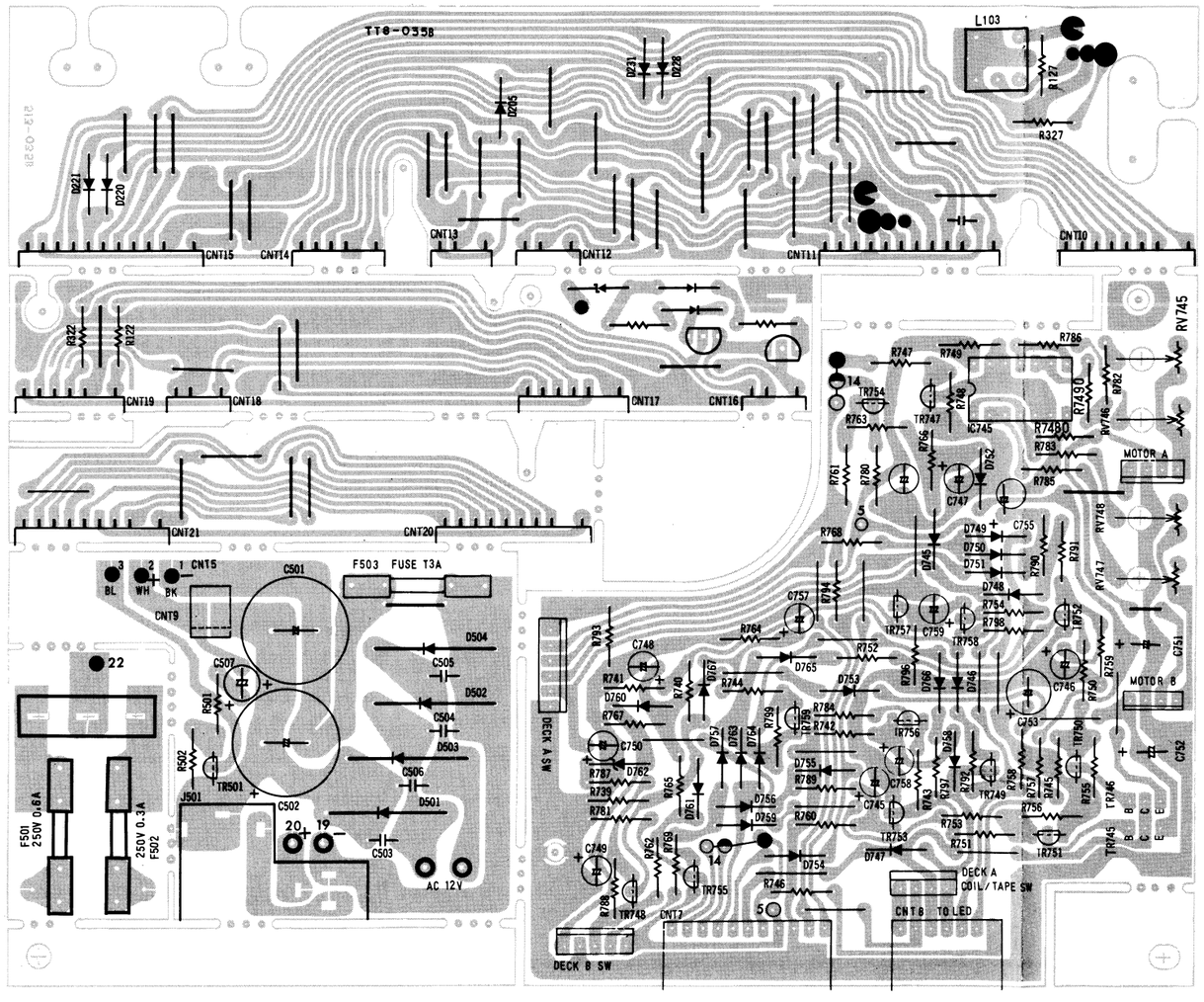
NOTES

P.C. BOARD ASSEMBLY (COMPONENTS SIDE)

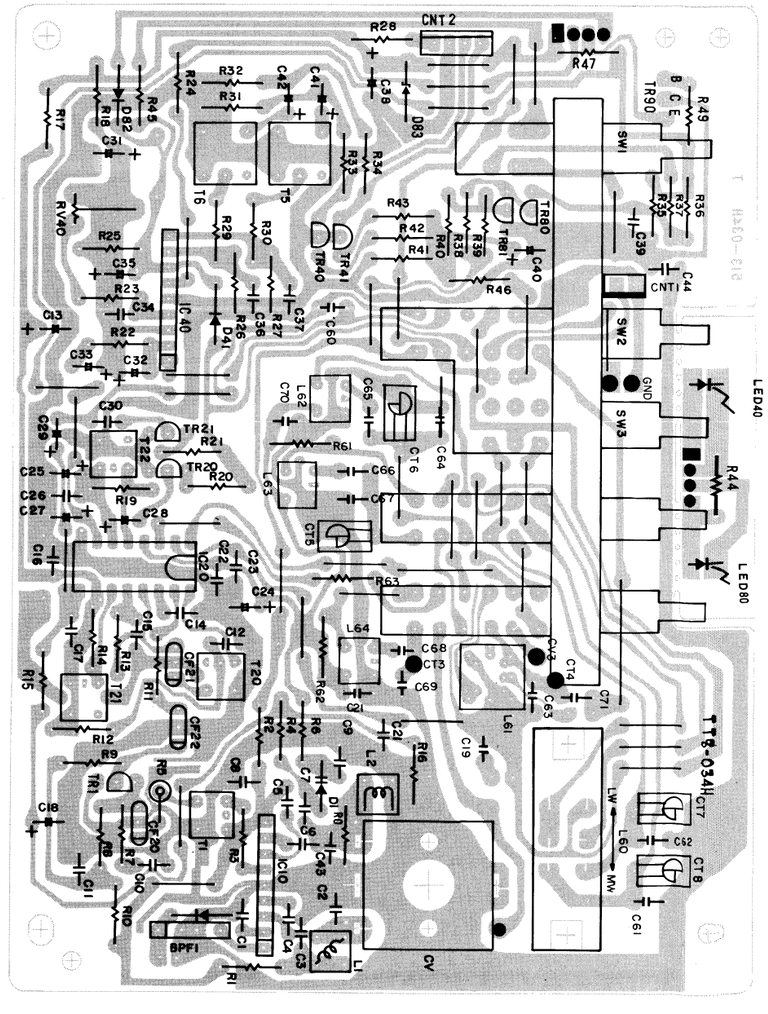
AIN, VOLUME P.C BOARD



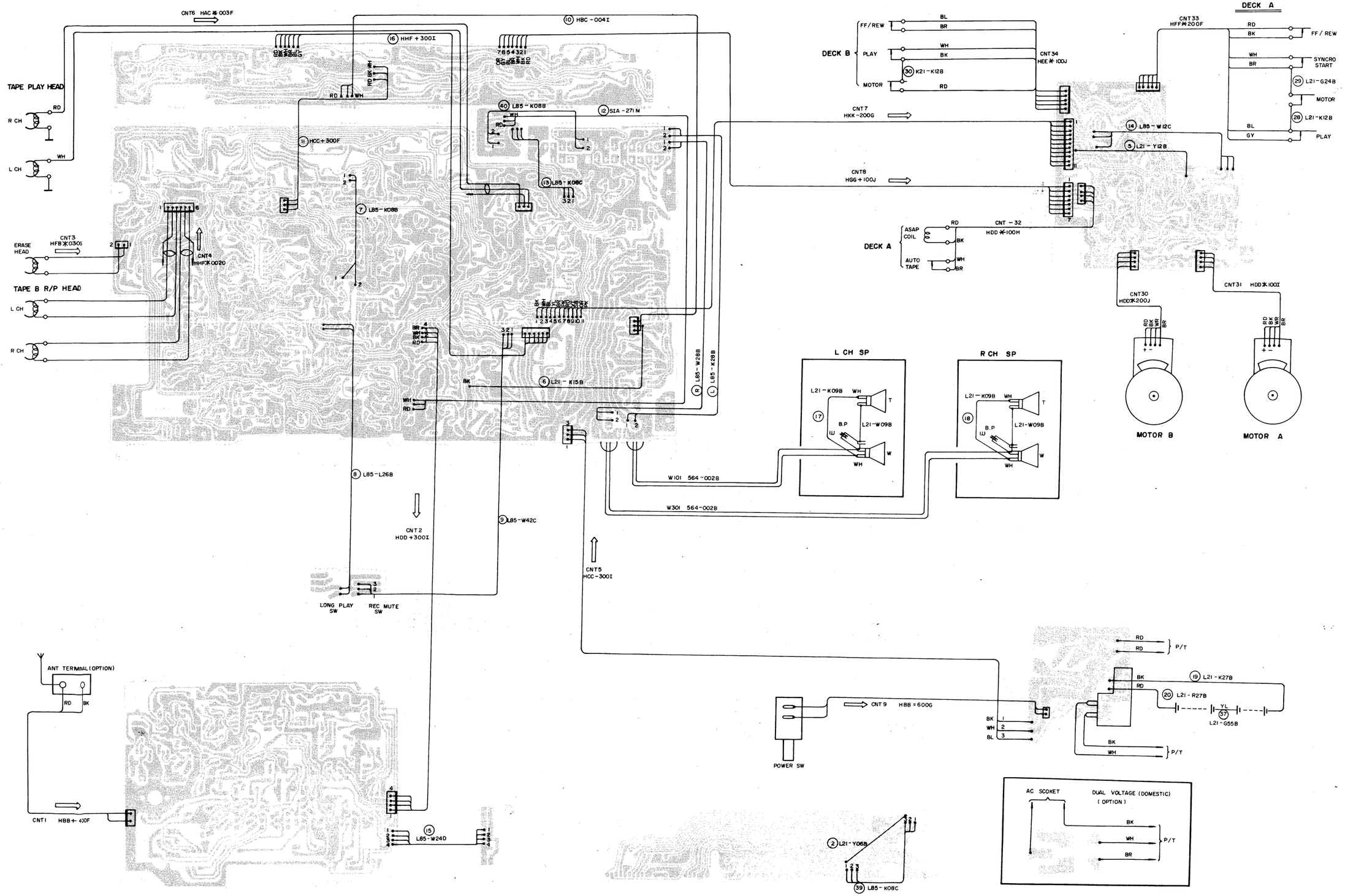
MOTOR CONTROL, POWER P.C. BOARD



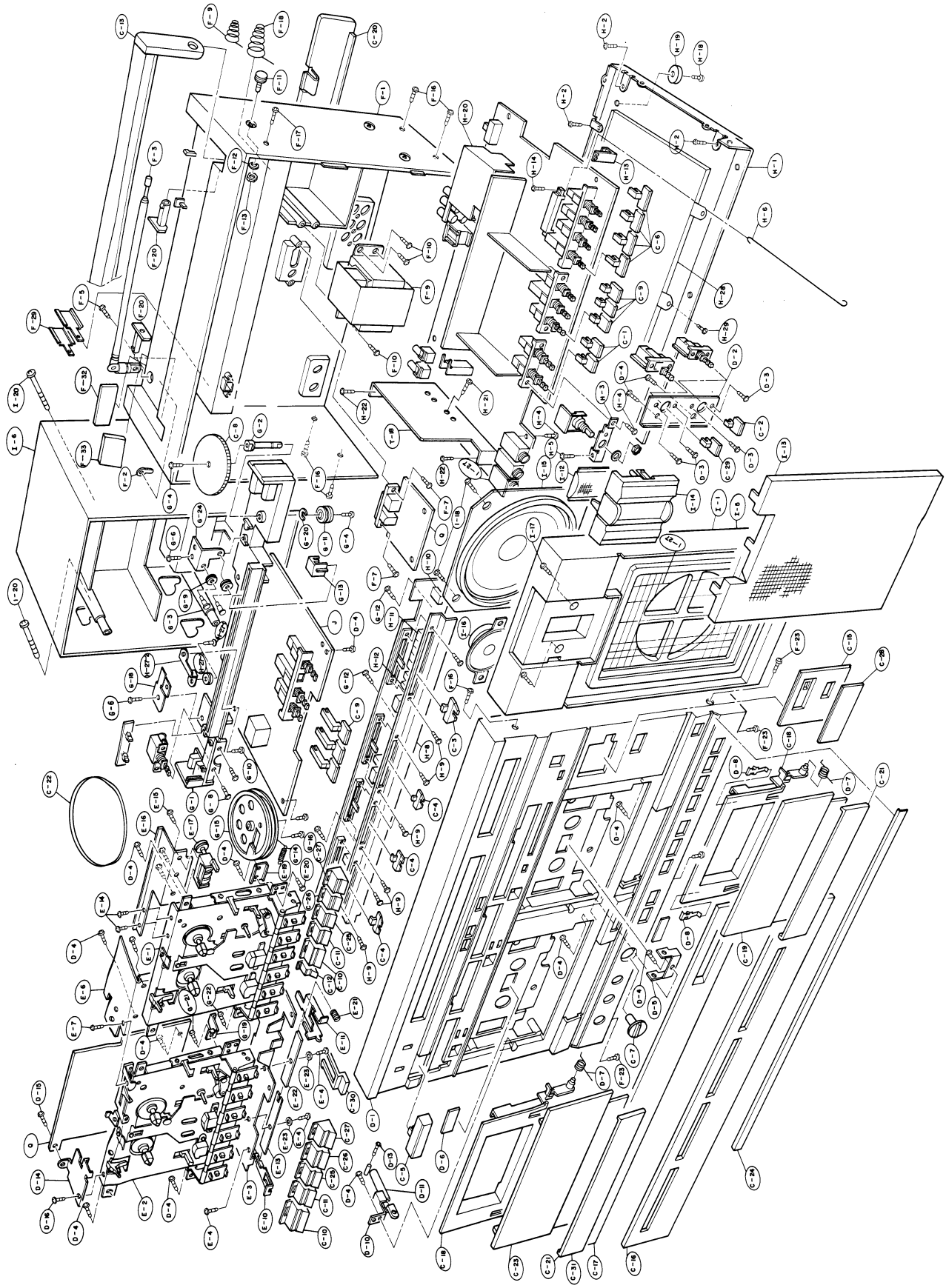
RF P.C. BOARD



WIRING DIAGRAM

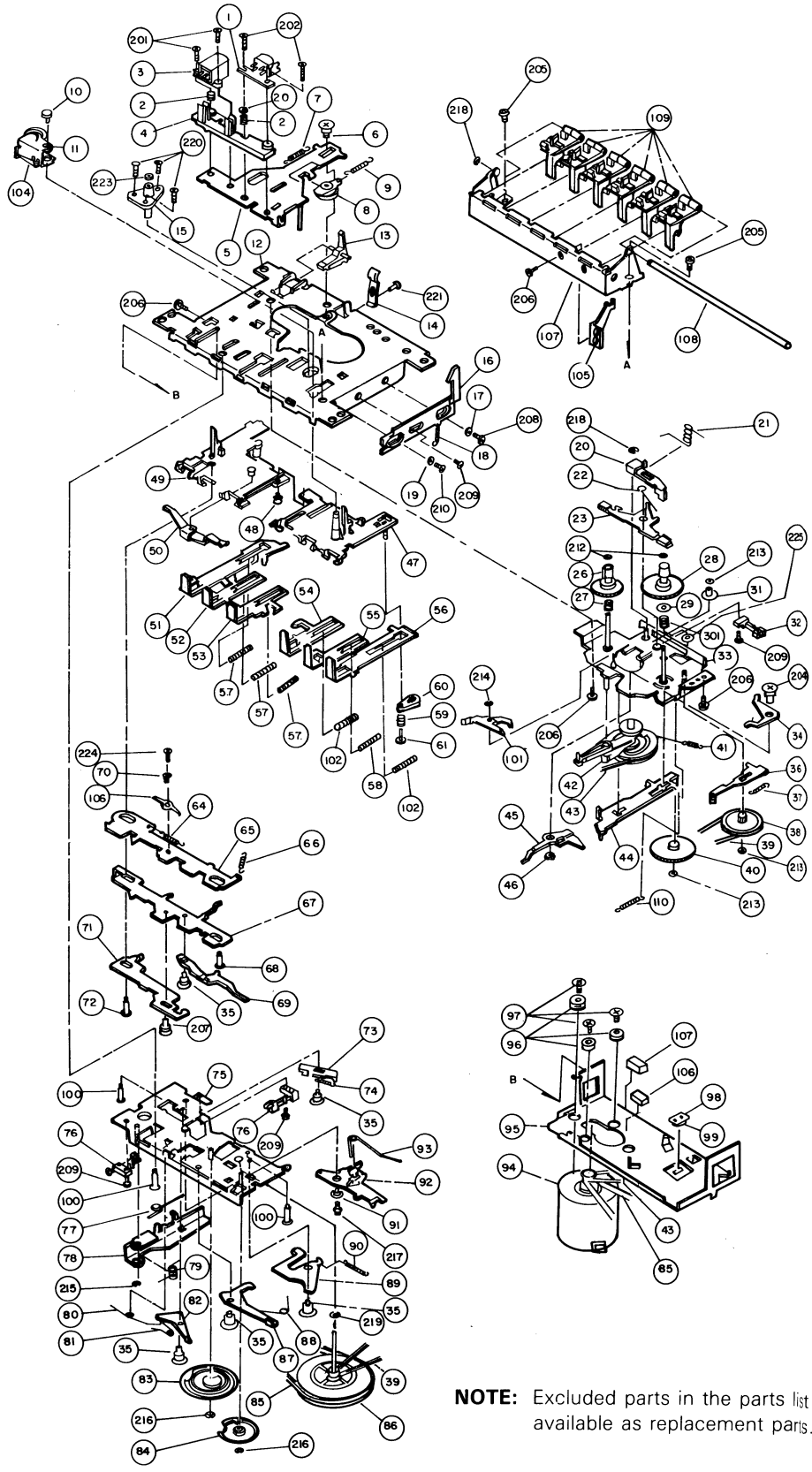


EXPLODED VIEW OF CABINET



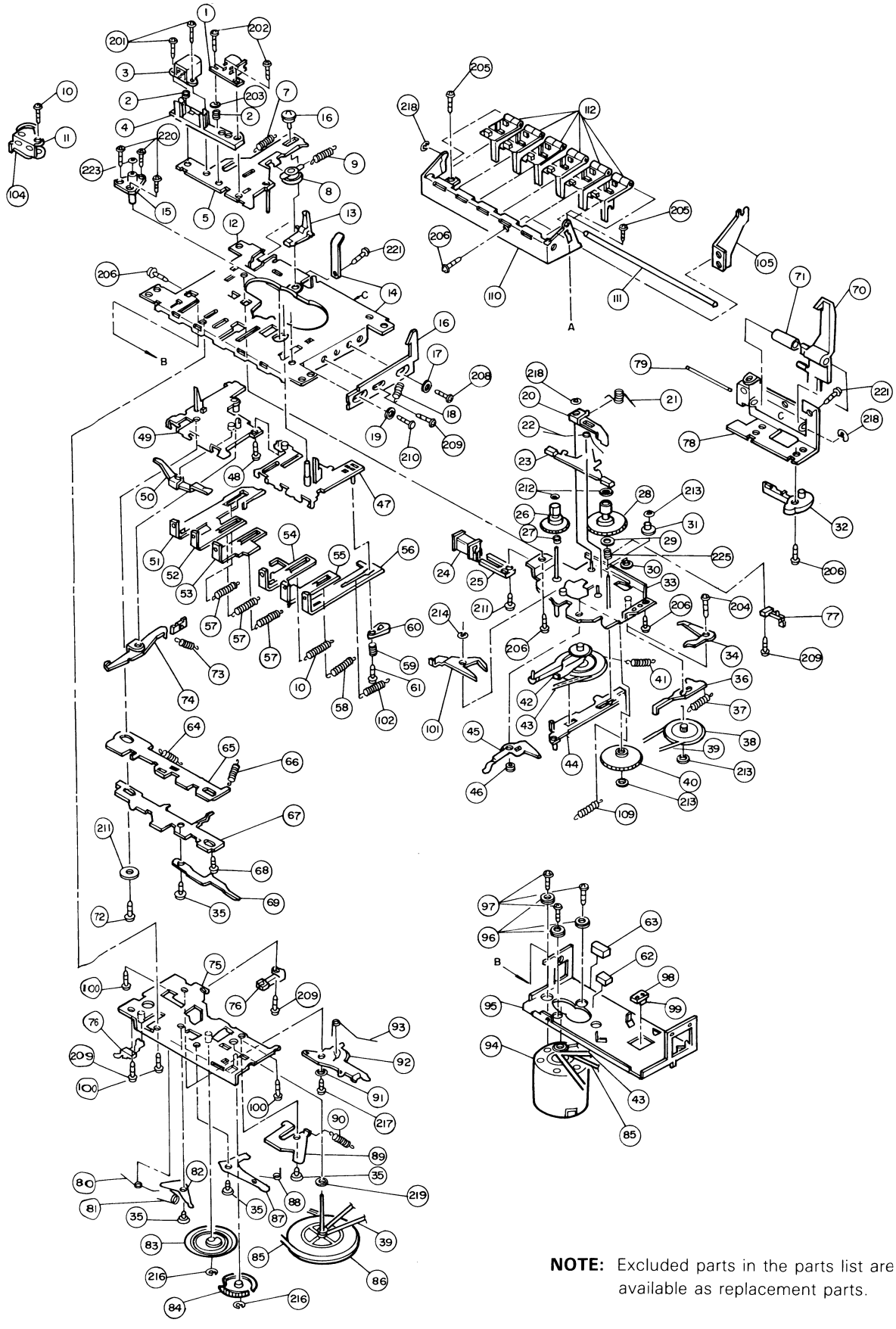
EXPLODED VIEW OF DECK MECHANISM

RECORD/PLAY DECK MECHANISM



NOTE: Excluded parts in the parts list are not available as replacement parts.

PLAY BACK DECK MECHANISM



NOTE: Excluded parts in the parts list are not available as replacement parts.

ELECTRICAL PARTS LIST

CAUTION: A ⚠ in the schematic diagram and the parts list designates components which have special important safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2 in this manual. Do not harm the safety of the receiver through improper servicing.

Ref. No.	Mfr's Part No.	Description
INTEGRATED CIRCUITS		
IC10	668-108D	KIA7358P-FM FNT
IC20	668-192A	KIA7640AP-AM/FM IF
IC40	668-159A	KIA7343P-MPX
IC101	668-560A	AN7161-Power
IC201	668-110A	KA1222-PH/Tape EQ
IC202	668-622A	TA7658P-EQ
IC203	668-110A	KA1222-PH/Tape EQ
IC204	668-664A	HA12045-Dolby NR
IC205	668-110A	KA1222-PH/Tape EQ
IC206	668-110A	KA1222-PH/Tape EQ
IC207	668-667A	BA338-ASAP
IC301	668-560A	AN7161-Power
IC701	668-666A	LB1413N-5 Dot Drive (GN)
IC745	668-662A	LC4066-Analog SW
TRANSISTORS		
TR1	665-820B	KTC380TM-O
TR20	665-812B	KTC1815-Y
TR21	665-812B	KTC1815-Y
TR40	665-812B	KTC1815-Y
TR41	665-812B	KTC1815-Y
TR80	665-812B	KTC1815-Y
TR81	665-812B	KTC1815-Y
TR90	665-813B	KTA1015-Y
TR101	665-814B	KTC1959-Y
TR102	665-830B	KTC2120-Y
TR103	665-812B	KTC1815-Y
TR104	665-816A	KTC732TM-GR
TR105	665-830B	KTC2120-Y
TR106	665-812B	KTC1815-Y
TR107	665-814B	KTC1959-Y
TR108	665-814B	KTC1959-Y
TR109	665-814B	KTC1959-Y
TR110	665-814B	KTC1959-Y
TR111	665-830B	KTC2120-Y
TR202	665-814B	KTC1959-Y
TR203	665-814B	KTC1959-Y
TR205	665-814B	KTC1959-Y
TR207	665-708B	KTD526-Y
TR208	665-815B	KTA562TM-Y
TR209	665-814B	KTC1959-Y
TR210	665-814B	KTC1959-Y
TR211	665-815B	KTA562TM-Y
TR212	665-814B	KTC1959-Y
TR213	665-814B	KTC1959-Y
TR214	665-814B	KTC1959-Y
TR215	665-814B	KTC1959-Y
TR216	665-881B	2SC2236-O
TR217	665-815B	KTA562TM-Y
TR301	665-814B	KTC1959-Y
TR302	665-830B	KTC2120-Y
TR303	665-812B	KTC1815-Y
TR304	665-816A	KTC732TM-GR
TR305	665-830B	KTC2120-Y
TR306	665-812B	KTC1815-Y
TR307	665-814B	KTC1959-Y
TR308	665-814B	KTC1959-Y
TR309	665-814B	KTC1959-Y
TR310	665-814B	KTC1959-Y
TR311	665-830B	KTC2120-Y
TR401	665-814B	KTC1959-Y
TR402	665-814B	KTC1959-Y
TR403	665-830B	KTC2120-Y
TR405	665-814B	KTC1959-Y
TR406	665-830B	KTC2120-Y
TR407	665-812B	KTC1815-Y
TR501	665-815B	KTA562TM-Y
TR601	665-814B	KTC1959-Y
TR602	665-814B	KTC1959-Y
TR603	665-830B	KTC2120-Y
TR605	665-814B	KTC1959-Y
TR606	665-830B	KTC2120-Y
TR607	665-812B	KTC1815-Y
TR701	665-814B	KTC1959-Y
TR745	665-708B	KTD526-Y
TR746	665-708B	KTD526-Y
TR747	665-814B	KTC1959-Y
TR748	665-815B	KTA562TM-Y
TR749	665-881B	2SC2236-O
TR750	665-815B	KTA562TM-Y
TR751	665-815B	KTA562TM-Y
TR752	665-814B	KTC1959-Y
TR753	665-814B	KTC1959-Y
TR754	665-815B	KTA562TM-Y
TR755	665-815B	KTA562TM-Y
TR756	665-814B	KTC1959-Y
TR757	665-814B	KTC1959-Y
TR758	665-814B	KTC1959-Y
TR759	665-815B	KTA562TM-Y
TR801	665-814B	KTC1959-Y
TR901	665-814B	KTC1959-Y
DIODES		
D1	654-418A	1S2236-AFC

Ref. No.	Mfr's Part No.	Description
D41	652-605B	IS2472-Switch
D82	652-605B	IS2472-Switch
D83	654-608D	Zener, ZPD5.6
D101	652-605B	IS2472-Switch
D102	652-605B	IS2472-Switch
D103	652-605B	IS2472-Switch
D105	652-605B	IS2472-Switch
D106	652-605B	IS2472-Switch
D107	652-605B	IS2472-Switch
D108	652-605B	IS2472-Switch
D201	654-622G	Zener, UZ3.6B
D203	654-622G	Zener, UZ3.6B
D204	652-605B	IS2472-Switch
D205	652-605B	IS2472-Switch
D206	652-605B	IS2472-Switch
D207	654-623F	Zener, UZ9.1B
D209	652-605B	IS2472-Switch
D210	652-605B	IS2472-Switch
D213	652-605B	IS2472-Switch
D215	652-605B	IS2472-Switch
D216	652-605B	IS2472-Switch
D217	652-605B	IS2472-Switch
D218	652-605B	IS2472-Switch
D219	652-605B	IS2472-Switch
D220	652-605B	IS2472-Switch
D221	652-605B	IS2472-Switch
D222	652-605B	IS2472-Switch
D223	652-605B	IS2472-Switch
D225	652-605B	IS2472-Switch
D226	652-605B	IS2472-Switch
D227	652-605B	IS2472-Switch
D228	652-605B	IS2472-Switch
D229	652-605B	IS2472-Switch
D230	652-605B	IS2472-Switch
D231	652-605B	IS2472-Switch
D232	652-605B	IS2472-Switch
D234	652-605B	IS2472-Switch
D235	654-622G	Zener, UZ3.6B
D301	652-605B	IS2472-Switch
D302	652-605B	IS2472-Switch
D303	652-605B	IS2472-Switch
D305	652-605B	IS2472-Switch
D306	652-605B	IS2472-Switch
D307	652-605B	IS2472-Switch
D308	652-605B	IS2472-Switch
D501	652-010C	P300D G, I-Rect
D502	652-010C	P300D G, I-Rect
D503	652-010C	P300D G, I-Rect
D504	652-010C	P300D G, I-Rect
D702	653-630A	LED, 5 Array SLJ265UR5HL RD
D703	653-630A	LED, 5 Array SLJ265UR5HL RD
D704	653-630A	LED, 5 Array SLJ265UR5HL RD
D705	653-630A	LED, 5 Array SLJ265UR5HL RD
D706	653-630A	LED, 5 Array SLJ265UR5HL RD
D707	653-611H	LED, SLB26UR3 RD
D708	653-611H	LED, SLB26UR3 RD
D709	653-636A	LED, SIR54URC3 RD
D710	653-636A	LED, SIR54URC3 RD
D711	653-611H	LED, SLB26UR3 RD
D712	653-611H	LED, SLB26UR3 RD
D713	653-611H	LED, SLB26UR3 RD
D714	653-611H	LED, SLB26UR3 RD
D715	653-611H	LED, SLB26UR3 RD
D716	653-636B	LED, SLR54GC3 L
D717	651-001C	AM1K60-Detect
D745	652-605B	IS2472-Switch
D746	652-605B	IS2472-Switch
D747	652-605B	IS2472-Switch
D748	652-605B	IS2472-Switch
D749	652-605B	IS2472-Switch
D750	652-605B	IS2472-Switch
D751	652-605B	IS2472-Switch
D752	652-605B	IS2472-Switch
D753	652-605B	IS2472-Switch
D754	652-605B	IS2472-Switch
D756	652-605B	IS2472-Switch
D757	652-605B	IS2472-Switch
D758	652-605B	IS2472-Switch
D759	652-605B	IS2472-Switch
D760	652-605B	IS2472-Switch
D761	652-605B	IS2472-Switch
D762	654-622G	Zener, UZ3.6B
D763	652-605B	IS2472-Switch
D764	652-605B	IS2472-Switch
D765	652-605B	IS2472-Switch
D766	652-605B	IS2472-Switch
D767	652-605B	IS2472-Switch
D801	651-001C	AM IK60-Detect
D802	651-001C	AM IK60-Detect
D901	651-001C	AM IK60-Detect
D902	651-001C	AM IK60-Detect
LED40	653-611D	LED, SLB26 GG GN
LED80	653-611A	LED, SLB26 UR RD

COILS AND TRANSFORMERS

L1	635-020A	Coil, FM RF (OSC)
L2	635-020B	Coil, FM RF (OSC)
L60	632-201B	Coil, MW/LW 120 mm
L61	634-020F	Coil, SW Ant 517-18.5 MHz
L62	634-015C	Coil, MW OSC
L63	634-037L	Coil, LW OSC
L64	634-020E	Coil, SW OSC 5.7-18.5 MHz
L101	638-105A	Coil, Trap (85 kHz)
L103	638-102A	Coil, MPX Filter
L201	639-003I	Coil, Padding 4.7 μH
L202	634-610B	Coil, Tape OSC 85 kHz —Recording OSC
L301	638-105A	Coil, Trap (85 kHz)
L302	637-601F	Coil, Peaking 8.2 mH
L401	638-105A	Coil, Trap (85 kHz)

Ref. No.	Mfr's Part No.	Description
L601	638-105A	Coil, Trap (85 kHz)
T1	644-018F	Trans, FM IF
T5	638-102A	Coil, MPX Filter
T6	638-102A	Coil, MPX Filter
T20	644-039M	Trans, MW IF
T21	647-011F	Discriminator
T22	644-039N	Trans, MW IF
SWITCHES AND JACKS		
SW1-5	554-625A	SW, Push SPUNS2M
S201	554-624E	SW, Push SUL441A Inter-Lock —Function
S202	554-624E	SW, Push SUL441A Inter-Lock —Function
S203	554-624E	SW, Push SUL441A Inter-Lock —Function
S204	554-624E	SW, Push SUL441A Inter-Lock —Function
S205	552-035B	SW, Slide CL106B—R/P SW
S206	554-624D	SW, Push SPUL32 —Tape Selector
S207	554-624D	SW, Push SPUL32 —Tape Selector
S208	554-624D	SW, Push SPUL32 —Tape Seector
S209	554-624C	SW, Push SPL24—NR/D Speed
S210	554-624B	SW, Push SUL121A Non-Lock —Long Play
S211	554-624C	SW, Push SPL24—NR/D Speed
S212	552-614A	SW, Slide KSA-2317—RIF SW
S213	554-620A	SW, Power SDW1P
S223	554-624A	SW, Push SUL121A Self-Lock —Rec Mute
	558-029B	SW, Leaf LSA-1119H —Syncro Start
J101	576-001A	Jack, Block 1P S-155B Ext Speaker
J102	572-059A	Jack, D=6.4 P-HYT80-065 Mic Jack
J201	576-002B	Jack, block S-436P Phono
J203	572-059A	Jack, D=6.4 P-HYT80-065 Headphone Jack
J301	576-001A	Jack, Block 1P S-155B Ext Speaker
J302	572-059A	Jack, D=6.4 P-HYT80-065 Mic Jack
J501	577-004A	Socket AC-IN (Socket with DC Jack)
VOLUMES		
VR40	613-021E	VR, Semi Fixed 10KB
VR201	611-647Z	VR, 20KA—Mic Mixer
VR701	612-610G	VR, 50KW—Balance
VR702	612-614A	VR, 20KB—Volume
VR703	612-610F	VR, 100KB—Tone
VR704	612-610F	VR, 100KB—Tone
RV101	613-021E	VR, Semi Fixed 10KB
RV102	613-021E	VR, Semi Fixed 10KB
RV301	613-021E	VR, Semi Fixed 10KB
RV302	613-021E	VR, Semi Fixed 10KB
RV401	613-021E	VR, Semi Fixed 10KB
RV402	613-021E	VR, Semi Fixed 10KB
RV403	613-021G	VR, Semi Fixed 50KB
RV601	613-021E	VR, Semi Fixed 10KB
RV602	613-021E	VR, Semi Fixed 10KB
RV603	613-021G	VR, Semi Fixed 50KB
RV745	613-021D	VR, Semi Fixed 5KB
RV746	613-021D	VR, Semi Fixed 5KB
RV747	613-021D	VR, Semi Fixed 5KB
RV748	614-021D	VR, Semi Fixed 5KB
MISCELLANEOUS PARTS		
BPF1	616-011A	Filter, Band Pass—FM Band
CF20	616-007A	Filter, Ceramic SFE10.7MA8
CF21	616-003D	Filter, Ceramic SFU455B
CF22	616-007A	Filter, Ceramic SFE10.7MA8
CV1-4 CT1-4	622N048A	Varicon, Poly
⚠F501	585-116B	Fuse, 5×20 250V3.15A for DC
	586-001C	Fuse Clip 5×20 Pin Type
CT5,7	623N023H	Trimmer—LW Band
CT6,8	623N023B	Trimmer—MW Band
	563-500A	Terminal, Ground
Hosiden	573-075A	Socket, Din TCS0710-01-010

MECHANICAL PARTS LIST

CABINET

Ref. No.	Mfr's Part No.	Description	Ref. No.	Mfr's Part No.	Description
C1	273-860A	Knob, Tape Selector	D14	321-074A	Bracket PCB A
C2	273-861A	Knob, Rec Mute (Red)	D15	TRQ1830J	Screw, TRQ2 + 3 × 6A
C3	273-862A	Knob, Volume			(Bracket PCB A Fix)
C4	273-863A	Knob, Tone (Bass, Treble, Balance)	D16	MBC1822J	Screw, MBC + 3 × 4
C5	273-864A	Knob, Power			(Bracket PCB A Fix)
C6	273-865A	Knob, Function (Tape, Tuner, Aux, Phono)	D18	353-052C	Screw, Special (CST Door Fix Washer Screw)
C7	273-866A	Knob, Mic Volume	D19	TPQ-0930L	Screw, TPQ2 × 8 (RIF SW Fix)
C8	273-867A	Knob, Tuning	E1	419-006A	Deck Mechaism TN39F-335RP
C9	273-868A	Knob, Band Selector	E2	419-006B	Deck Mechanism TN39F-336PB
C10	273-869A	Konb, Deck A	E3	321-071A	Bracket, Mechanism, "F"
C11	273-870A	Knob, Deck B	E4	353-022B	Screw
C12	273-871B	Knob, Deck B	E5	TRQ1536J	Screw (Mech, Fix)
C13	261-617A	Handle Ay	E6	321-070A	Bracket, Mech "R"
C13-1	261-098D	Handle	E7	TRQ1830J	Screw, TRQ2 + 3 × 6A
C13-2	324-490A	Holder, Handle			(Bracket Mech. R Deck Fix)
C13-3	MCC1836L	Screw, MCC + 3 × 8 FNM	E10	255-132A	Plate, Slide
C15	236-250A	Window, Counter	E11	255-131A	Plate, Syncro
C16	236-251A	Window, Control	E13	333-242A	Lever, "B"
C17	236-252B	Window, Dial	E14	353-022B	Screw
C18	226-114C	Door, CST	E16	321-066A	Bracket, Counter
C19	236-253A	Window, CST	E17	517-111A	Tape Counter
C20	221-030B	Cover, Battery	E19	321-839A	Bracket Deck MTG
C21	246-061A	Decoration, CST	E20	MPC1830J	Screw, MPC + 3 × 6
C22	451-146G	Belt, Counter			(Bracket Deck MTG)
C23	236-253B	Window, CST (Left)	E21	442-712A	Spring, Editor
C24	246-062A	Decoration, Deck			(Plate Syncro Fix)
C25	273-870B	Knob, Deck	E22	333-241A	Lever A
C26	273-870C	Knob, Deck D	E23	422-011F	Shaft, Roller
C27	273-870D	Knob, Deck E	E24	423-292A	Shaft
C28	221-034A	Cover, Decoration	E25	353-022C	Screw (Tape Counter Fix Deck Fix)
C29	273-861B	Knob, Long Play	F1	217-851C	Case, Rear
C30	273-900B	Knob, Syncro (Blue)	F2	562-702A	Antenna Lug
C31	246-061B	Decoration CST	F3	532-003D	Antenna, Rod
C32	273-860B	Knob, Tape Selector	F4	353-025L	Screw, Special
		(Hi-Speed, Dolby NR)	F5	MAC1845L	Screw, MAC + 3 × 18 FNM
D1	217-850B	Case, Front			(Antenna Rod Fix)
D2	321-065A	Bracket, Switch	F7	353-025G	Screw, Special (Power Jack Fix)
D3	MBC1830J	Screw MBC + 3 × 6 FZMY	F9	442-511A	Spring Battery A
		(Bracket SW Fix)	F10	353-025G	Screw, Special (Trans Power Fix)
D4	353-025G	Screw, Special (Deck Ay Resin Fix)	F11	423-307B	Shaft, Attachement
D5	324-284A	Holder, Door CST	F12	WPL2600H	Washer WPL-5
D6	256-199B	Plate, Reflection	F13	NHA2600J	Nut, NH1-5 FE
D7	442-922A	Spring, CST Door	F16	TAQ1843L	Screw, TAQ3 × 14
D8	442-211A	Spring, Cassette			(Rear Case Bottom down fix)
D10	321-831A	Bracket, Damper	F17	353-025L	Screw, Special
D11	444-100B	Damper, Air	F18	442-511B	Spring Battery B
D12	MRC0943J	Screw, MRC + 2 × 14 FZMY	F19 ⚠	641-902C	Trans Power AC 220V
		(Damper Air Fix)	F20	423-145A	Shaft, Handle
D13	TRQ1530J	Screw, TRQ2 + 2.6 × 6A	F23	TCQ1839L	Screw, TCQ × 3 × 10
		(Bracket PCB A Fix)			(Chassis Fix Front)

Ref. No.	Mfr's Part No.	Description
F26	TRQ2230L	Screw 4 × 6
		(Front Case Chassis Down Fix)
F27	447N0150	Cushion, Battery 10 × 200
F28	342-001B	Parking Rubber
F29	563N126A	Terminal, Battery
F30	TAQ1843L	Screw 3 × 14
F31	447-059A	Cushion, Speaker (Rear Case Fix)
F32	251-620A	Plate, Ext Ant (Rear Case Fix)
F33	251-620B	Plate, Ext Ant
G1	313-307A	Chassis
G2	423-143A	Shaft, Tuning
G4	MPC1830J	Screw, MPC + 3 × 6
G6	353-025F	Screw, Special (Bracket A B Fix)
G8	MPC1839J	Screw, MPC + 3 × 10
		(Pulley Tuning Power SW)
G9	434-038A	Roller
G10	MPC1839J	Screw, MPC + 3 × 10
		(Bracket PCB C Fix)
G11	432-071A	Pulley
G12	353-025F	Screw, Special (PWB Volume Fix)
G13	361-212A	Pointer
G14	442N064A	Spring, M
G15	433N038A	Wheel Main
G16	MPC1530J	Screw, MPC + 2.6 × 6
G18	321-063A	Bracket, Pulley B
G19	321-069A	Bracket, PCB B
G20	WE02200Q	Washer, E-Ring
G21	MPC1530J	Screw, MPC + 2.6 × 6
		(Bracket PCB B Fix)
G22	353-025F	Screw, Special
		(Bracket PCB B Fix)
G24	321-574A	Bracket Pulley A Ay
G24-1	321-062A	Bracket Pulley A
G24-2	422-011F	Shaft, Roller
G24-3	434-038A	Roller
H1	223-021B	Chassis, Bottom
H2	TRQ1830J	Screw, TRQ2 + 3 × 6A
		(Bottom PCB Fix)
H3	321-067A	Bracket, Mic Volume
H4	MPC1830J	Screw, MPC + 3 × 6
		(Bracket Mic Volume Fix)
H5	353-025E	Screw, Special
		(Bracket Mic Volume Fix)
H6	331-040A	Joint, Rec Switch
H8	321-072A	Bracket, VR
H9	MPC0918J	Screw, MPC2 × 3 FZMY
		(Bracket VR Fix)
H10	324-280A	Holder, LED (A)
H11	324-281A	Holder, LED (B)
H12	324-282A	Holder, LED (C)
H13	321-073A	Bracket, Rec SW
H14	MPC0930J	Screw (Bracket Rec SW)
H18	TRQ1830J	Screw, TRQ2 + 3 × 6A
		(Supporter Ay Fix)
H19	322-141A	Supporter Ay, Foot
H20	256-613A	Shield, Plate
H21	353-025G	Screw, Special (Heat Sink Fix)
H22	MBC1836J	Screw, MBC + 3 × 8 FZMY
		(Heat Sink PCB Fix)
H25	472-750A	Paper Fiber
H27	321-573A	Bracket Pulley C Ay
H27-1	422-011F	Shaft, Roller
H27-2	321-064A	Bracket, Pulley C
H27-3	434-038A	Roller
H28	223-022A	Bottom Plate
H29	TRQ2230L	Screw 4 × 6
H31	WPL1800H	Washer Plain
I1	217-852A	Case, SP Front
I2	217-853C	Case, SP Rear
I3	321-990A	Bracket Conduct - (L)
I4	321-845A	Bracket Locking - RH
I5	217-852D	Case, Speaker Front
I5-1	215-852D	Case, Speaker Ay
I6	217-853D	Speaker, Rear
I7	321-991A	Bracket Conduct - (R)
I8	321-837A	Bracket Locking - LH
I9	TCQ1839L	Screw, TCQ × 3 × 10
I12	224-071A	Grille, Speaker "T"
I13	224-072A	Grille, Speaker "W"
I14	246-060A	Decoration, Speaker
I15	541-203A	Speaker 130K04-065F06
I16	541-139A	Speaker 050N06-1350F
I17	353-052C	Screw, Special (Speaker Fix)
I18	353-027A	Screw, Special
I19	472-700F	Felt, 20 × 10
I20	353-067D	Screw, Special (Speaker Rear Fix)
I21	564-002B	Cord, Speaker
I25	472-700H	Felt
I27	221-035A	Cover, Speaker
I28	256-611A	Shield Plate (PCB Fix)
I31	472-700H	Felt
		(Front Case Fix Rear Case Fix)
T17	TRQ1830J	Screw, TRQ2 + 3 × 6A
		(Regulator TR Heat Sink Fix)
T18	255-133A	Heat Sink (For Power IC)
T19	255-107B	Heat Sink (For Regulator TR)
J	511-034H	PWB Ay, RF
Q	511-035A	PWB Ay, Motor Control, Power
T	511-036A	PWB Ay, Main, Volume
	681-035A	Power Cord

R/P DECK MECHANISM

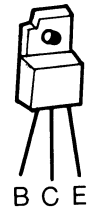
Ref. No.	Mfr's Part No.	Description	Ref. No.	Mfr's Part No.	Description
1	99T-0310	R/P Head	60	99T-0337	Pause Lever
3	99T-0311	Erase Head	61	99T-0338	P Stopper
8	99T-0314	Take Up Roller Shaft Ay	76	99T-0343	Leaf S/W
10	99T-0315	Function Lever Stop	78	99T-0345	Rec Function Arm
11	99T-0316	Pinch Roller Arm Ay	83	99T-0348	M Gear
13	99T-0317	Rec Safety Lever	84	99T-0349	P Gear
14	99T-0318	Pack Hold Spring	85	99T-0350	Main Belt
26	99T-0322	Supply Reel Ay	86	99T-0352	Flywheel Ay
28	99T-0324	Take Up Reel Ay	94	99T-0723	Motor Rubber
32	99T-0327	Leaf Switch	98	99T-0359	Flywheel Patch Plate
38	99T-0331	Pully	99	99T-0360	Damper Spring
39	99T-0332	Full Auto Belt	104	99T-0659	Pinch Roller Spring
40	99T-0622	Cam Gear	109	99T-0365	Operation Lever
43	99T-0335	RF Belt	212	99T-0690	E-Ring Special

PLAY BACK DECK MECHANISM

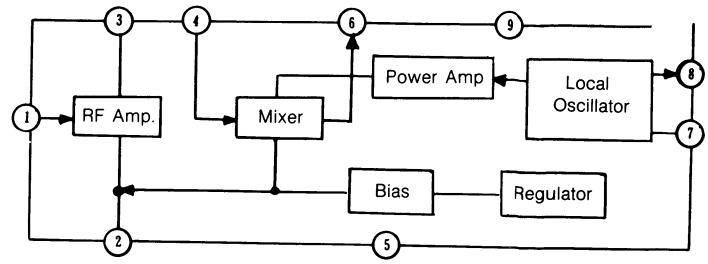
Ref. No.	Mfr's Part No.	Description	Ref. No.	Mfr's Part No.	Description
1	99T-0310	R/P Head	60	99T-0337	Pause Lever
3	99T-0707	Erase Head	61	99T-0338	P Stopper
8	99T-0314	Take Up Roller Shaft Ay	76	99T-0343	Leaf S/W
10	99T-0315	Function Lever Stop	77	99T-0327	Leaf Switch
11	99T-0316	Pinch Roller Arm Ay	78	99T-0731	Sensing Lever Angle
14	99T-0318	Pack Hold Spring	83	99T-0348	M Gear
24	99T-0614	Coil Ay	84	99T-0349	P Gear
25	99T-0615	Core B	85	99T-0350	Main Belt
26	99T-0322	Supply Reel Ay	86	99T-0352	Flywheel Ay
28	99T-0324	Take Up Reel Ay	94	99T-0723	Motor
32	99T-0727	Leaf SW	98	99T-0359	Flywheel Patch Plate
38	99T-0331	Pully	99	99T-0360	Damper Spring
39	99T-0332	Full Auto Belt	104	99T-0659	Pinch Roller Spring
40	99T-0622	Cam Gear	109	99T-0725	Slide Lever Spring
43	99T-0335	RF Belt	212	99T-0690	E-Ring Special

TRANSISTOR LEAD IDENTIFICATION AND IC INTERNAL DIAGRAM

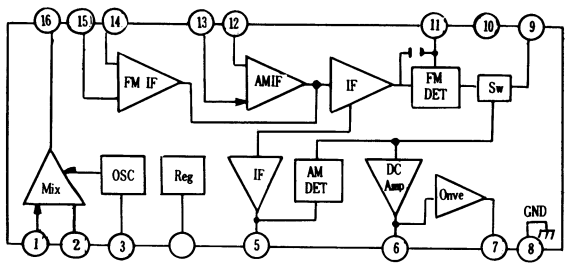
KTC 38TM—0
KTC 1959—Y
KTC 2120—Y
KTA 562TM-Y
2SC2236—O



KTD 526—Y



IC10 KIA7358P



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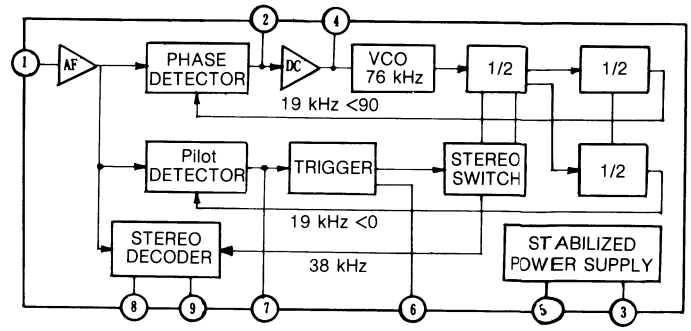

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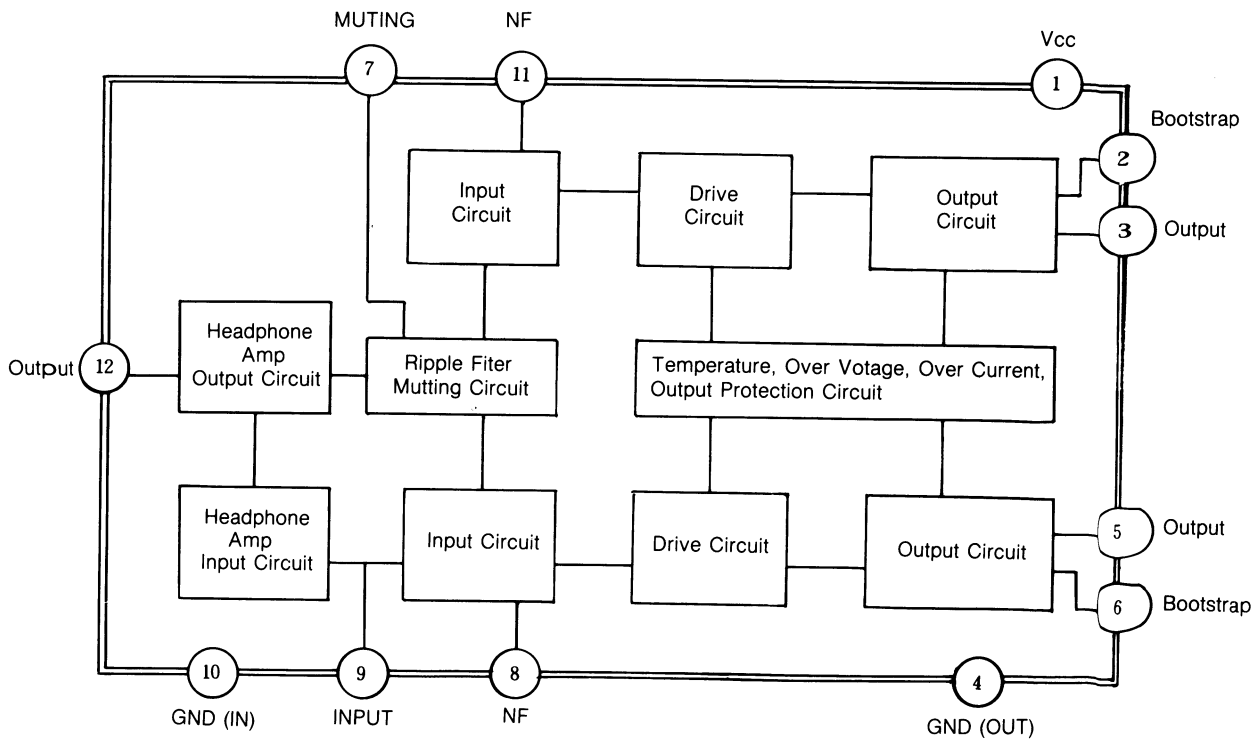
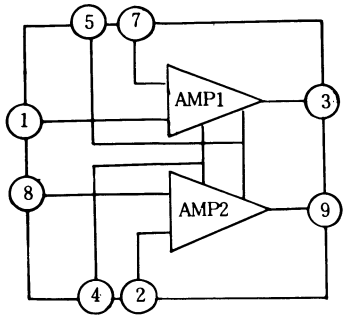
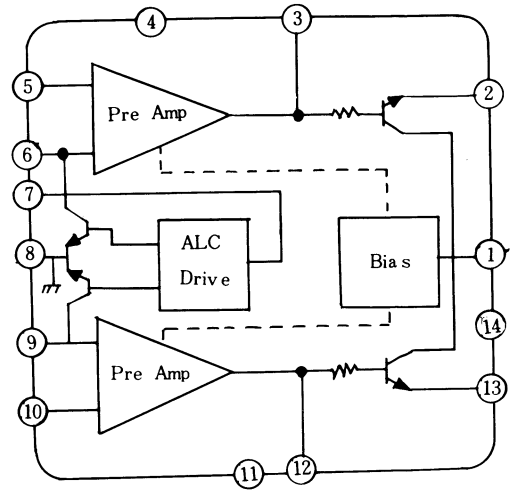


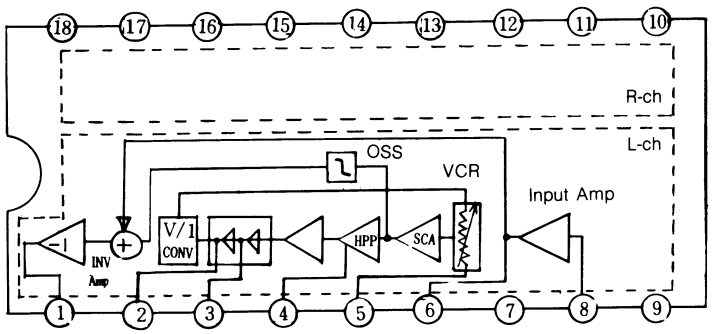
IC101/301 AN7161



IC201/203/205/206 KA1222



IC202 TA7658P



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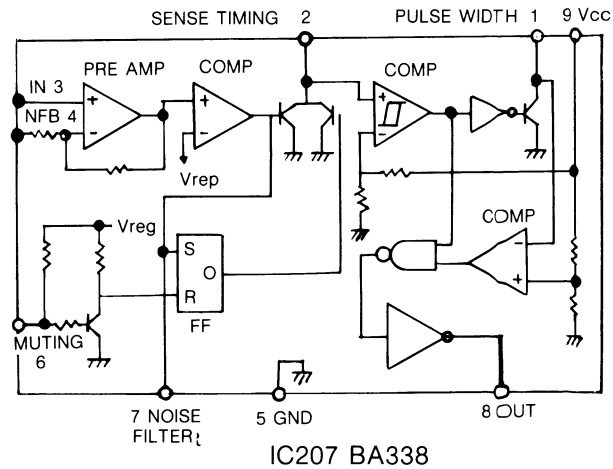

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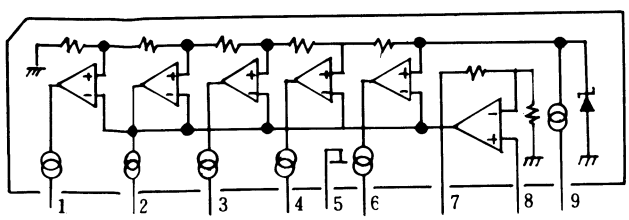
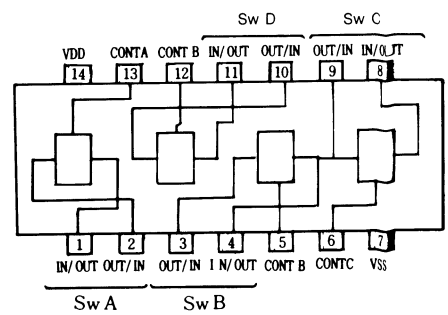


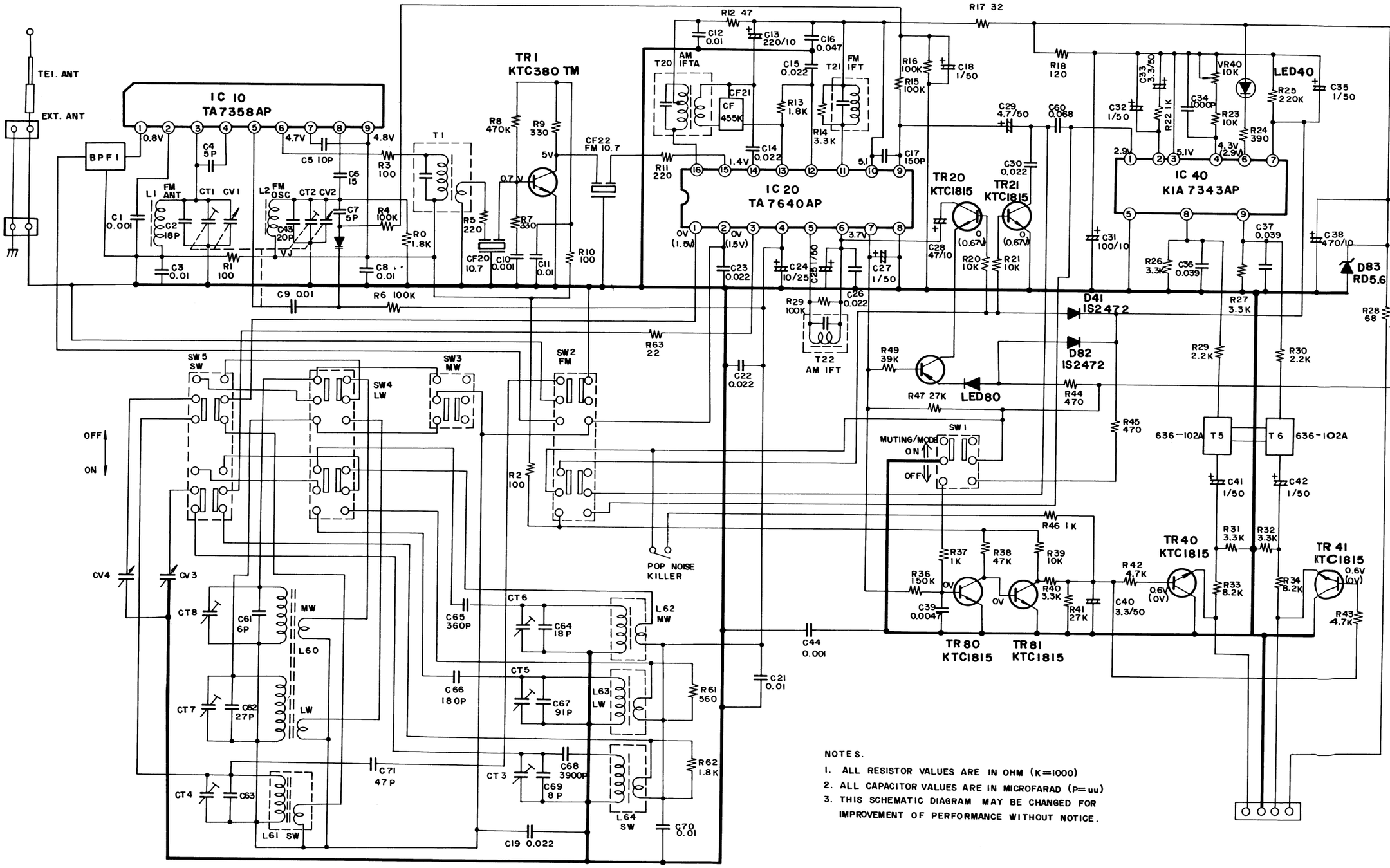
IC701 LB1413N



IC745 LC4066B

SCHEMATIC DIAGRAM

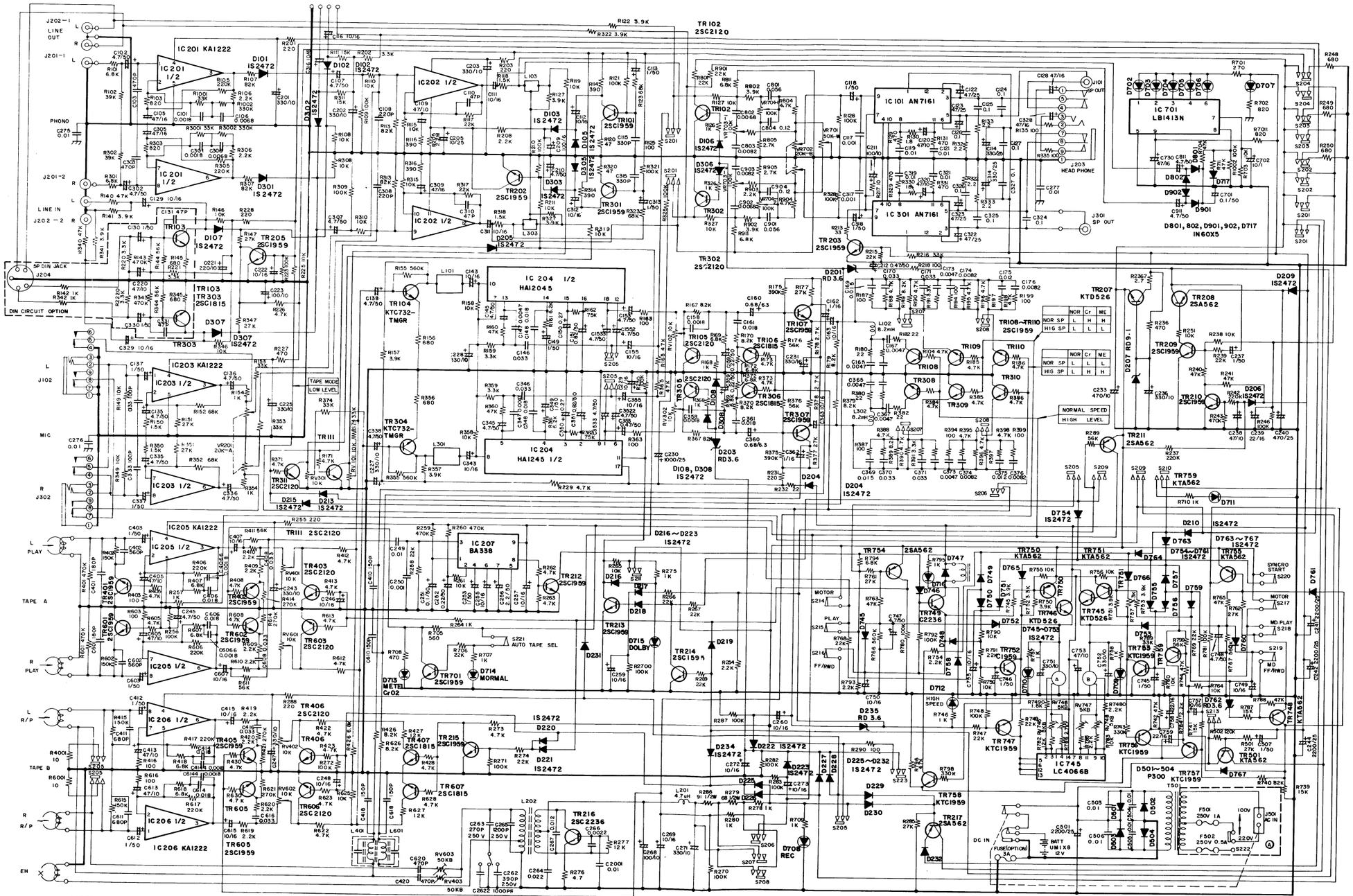
RF UNIT



NOTES.

1. ALL RESISTOR VALUES ARE IN OHM (K=1000)
2. ALL CAPACITOR VALUES ARE IN MICROFARAD (P=uu)
3. THIS SCHEMATIC DIAGRAM MAY BE CHANGED FOR IMPROVEMENT OF PERFORMANCE WITHOUT NOTICE.

DIO UNIT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IC 207 BA338
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IC 101 AN7161
IC 301 AN7161
IC 745 LC4066B
TR102 2SC2120
TR203 2SC1959
TR302 2SC2120
TR101 2SC1959
TR301 2SC1959
TR202 2SC1959
TR103 TR303 2SC1815
TR104 KTC732-TMGR
TR304 KTC732-TMGR
TR105 2SC2120
TR106 2SC1815
TR305 2SC2120
TR306 2SC1815
TR107 2SC1959
TR307 2SC1959
TR108~TR110 2SC1959
TR207 KTD526
TR208 2SA562
TR209 2SC1959
TR211 2SA562
TR759 KTA562
TR111 2SC2120
TR311 2SC2120
TR403 2SC2120
TR603 2SC2120
TR212 2SC1959
TR213 2SC1959
TR214 2SC1959
TR215 2SC1959
TR216 2SC2236
TR406 2SC2120
TR606 2SC2120
TR605 2SC1959
TR607 2SC1815
TR701 2SC1959
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TR745 KTD526
TR750 KTA562
TR751 KTA562
TR755 KTA562
TR752 KTC1959
TR753 KTC1959
TR756 KTC1959
TR757 KTC1959
TR758 KTC1959
TR217 2SA562
TR759 KTA562
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D102 IS2472
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D104 IS2472
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D107 IS2472
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D302 IS2472
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D306 IS2472
D307 IS2472
D201 RD3.6
D202 IS2472
D203 RD3.6
D204 IS2472
D207 R09.1
D208 IS2472
D209 IS2472
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D211 IS2472
D213 IS2472
D215 IS2472
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D234 IS2472
D220 IS2472
D221 IS2472
D222 IS2472
D225~D232 IS2472
D229
D230
D231
D235 RD 5.6
D712
D713 METEL Cr02
D714 NORMAL
D715 DOLBY
D708 REC
D754~D761 IS2472
D762 RD3.6
D763~767 IS2472
D801, 802, D901, 902, D717 IN60X5
D501~504 P300
D502
D504
D506
D507
D508
D701
D702
D707
D711
D717
D761
D767
D802
D902
D901
J202-1 LINE OUT
J201-1 PHONO
J201-2 LINE IN
J202-2
5P DIN JACK J204
DIN CIRCUIT OPTION
J102
J302
J301 SP OUT
J203 HEAD PHONE
J101 SP OUT
TAPE MODE
LOW LEVEL
NORMAL SPEED
HIGH LEVEL
S201
S202
S203
S204
S205
S206
S207
S208
S209
S210
S211
S213
S214 MOTOR
S215 PLAY
S216 FF/RWD
S217 MOTOR
S218 MD PLAY
S219 MD FF/RWD
S220 SYNCRO START
S221 AUTO TAPE SEL
S222
S223
S501
S502
S503
S504
S505
S506
S507
S508
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